BULLETIN OF MISCELLANEOUS INFORMATION No. 1 1933

ROYAL BOTANIC GARDENS, KEW

I.—MOXON MEMORIAL BEQUEST.

Towards the close of the year 1915 an official letter was received from a firm of London solicitors stating that certain clients of theirs were settling a sum of money for the purpose of establishing a fund, to be called " the A.B. and C.D. Memorial Fund," for furthering the study of Botany, but the names of the clients were not disclosed. The solicitors were duly informed that a bequest of this character might be linked with that of the Bentham Trust, should that be so desired, and there the matter rested for some time. It will be remembered that a few years later, the Herbarium collection of plant drawings was greatly enriched by the presentation to Kew by Mr. Alfred Edward Moxon of a very beautiful collection of water-colour drawings of Swiss Alpine plants, made by his Sister, the late Miss Margaret Louisa Moxon. She had during many years painted some 1,000 portraits of Swiss Alpine flowers, and these, thanks to the generosity of Mr. A. E. Moxon, have all been catalogued and accurately named, and are available for study in the Herbarium. An account of this bequest was given in Kew Bulletin, 1920, 371.

In connection with this gift a visit was paid to Mr. Moxon at New Milton, Hants, in October 1920, when he handed over the drawings and presented them to Kew in accordance with the wishes of his Sister. This visit was the only occasion on which anyone from Kew met Mr. Moxon, though after the visit a fairly regular correspondence was maintained with him until shortly before his death at Lausanne on May 26th, 1930.

After his death it transpired that it was Mr. A. E. Moxon and his Sister who were the clients referred to in the letter received at Kew in 1915.

We were informed by the Public Trustee, their executor, that Mr. Moxon and Miss Moxon had bequeathed the residue of their estates, subject to a life interest to the survivor of them, to the Bentham Trustees, and by a voluntary settlement, executed in 1916, had settled upon trust certain stocks and securities which, upon the death of the survivor of them, should likewise be transferred to the Bentham Trustees to establish a Fund to be called " the James Edward and Louisa Sarah Moxon Memorial Fund " and " to be applied and administered by the Bentham Trustees along with the Bentham Fund for furthering the study of Botany, the publishing of works on flowers and botany and the making of grants for travelling botanists for lectures and for the purpose of

botanical literary collections and books on botany for use at Kew Gardens, and for any other purpose for which the Bentham Fund might be used and applied." The two funds have now been united under the title of "The Bentham-Moxon Fund" and are administered by the Trustees.

Beyond the one visit to Mr. Moxon at New Milton, Kew unfortunately has known very little about either Mr. A. E. Moxon or his Sister, Miss M. L. Moxon, and we are therefore unaware of the exact reasons which led them to make so generous a bequest to the Royal Botanic Gardens, other than the keen interest they both shared in the flowers of the Swiss mountains.

We learn from Miss Florence Penrose Moxon, his cousin, that Mr. Moxon, on his Mother's side, was a lineal descendant of Sir Francis Drake, and he had always made Sir Francis Drake and Sir Walter Raleigh his two heroes; he also belonged to the old family of Penrose of Penrose, Cornwall, and as a memorial to his Mother he bequeathed his books to the Library of the City of Plymouth. Mr. Moxon was very greatly handicapped by his eyesight and in his younger days he could do nothing and could only see with very great difficulty. Later in life, as the result of a successful operation, he regained his sight to some degree and was able to read the books, mainly of travel, with which his shelves were richly stored. When I paid a visit to him in 1920 to examine Miss Moxon's drawings, it was very interesting to hear from him of his joy in the novel experience of being able to read his books and to see and appreciate to the full, after having been nearly blind for almost the first thirty years of his life, the beauty of the Alpine flowers, which he had learnt to love from the descriptions of his Mother and Sister. A. W. H.

II.—TANKERVILLE COLLECTION OF DRAWINGS.

A valuable collection of 648 original coloured drawings of plants, contained in 15 volumes, has been presented by the Bentham Trustees. Among them are 29 signed by G. D. Ehret, bearing dates ranging from 1756 to 1770, and 17 without signature, initials or date, probably by Ehret. Most of the others, which have dates ranging from 1783 to 1824, are apparently by Margaret Meen, though only 69 of them are initialled by her, and only three signed "M. Meen." Usually when there are the initials "M. M." they are so small as to be scarcely legible. A few other artists have contributed to the collection, one of whom was Lady Tankerville, whose work is represented by 22 paintings of plants made in Madeira in 1811 and 1812. The latest date observed is October, 1824, and that is on an anonymous drawing of a *Salvia*. Two drawings signed "M. Meen" are dated 1819, and two initialled "M.M." are dated 1820. Most of the drawings are on vellum, the sheets varying in size from 11 by 8 inches up to 26 by 18½ inches. Ehret's are usually on sheets measuring about 19 by 13 inches. All are named; those attributed to

Margaret Meen have as a rule names and other information taken from Aiton's " Hortus Kewensis." Plants from various parts of the world are depicted, a good number being Francis Masson's introductions from the Cape. A few are British. This collection was formerly in the library of the Earl of Tankerville at Chillingham Castle, Northumberland. Presumably the types of very many of the drawings were procured from the gardens there. The beauty of Ehret's paintings is well known. Little is recorded of Margaret Meen, but her work, as shown in the fragment published as " Exotic plants from the Royal Gardens at Kew," in 1790, is regarded as that of a talented artist. This work is the subject of notes in Kew Bull. 1893, 147, and Gard. Chron. 1894, xv. 197. She is known to have exhibited at the Royal Academy from 1775 to 1785, but she had not been traced after 1790. We have now ascertained that she was carrying on her work up to 1820. The numerous drawings by her in our possession provide ample evidence that Margaret Meen was a highly accomplished artist. In addition to the original drawings there are 20 coloured engravings or lithographs from drawings by Margaret Meen, G. D. Ehret, James Sowerby and Francis Bauer. These were published in M. Meen's work mentioned above, in Ehret's " Plantae Selectae," in Aiton's " Hortus Kewensis," and in Bauer's " Strelitzia depicta."

III.—THE STRUCTURE AND BOTANICAL IDENTITY OF SOME SCENTED WOODS FROM THE EAST.

C. R. Metcalfe.

During the last few years a number of scented wood specimens from Bangkok and other places in the East have been submitted for identification to the Jodrell Laboratory. Many of these, which pass under the local name of " Calambac " or similar names, have been sent by Dr. A. Kerr of the Botanical Section, Ministry of Commerce and Communications, Bangkok. In the course of examining these and other woods it has become increasingly clear that very great confusion exists concerning their botanical identity, due chiefly to a number of quite distinct species having acquired very similar vernacular and trade names. In the following pages the wood structure of each of these species is described and a list of the names (omitting a few variations in spelling) by which they are known individually, with some notes on their sources and uses, is given.

Unless stated to the contrary all the wood specimens examined are now in the Kew collections, and their reference numbers have been given in the lists of material at the end of each species. These are represented by the hyphened numbers. Where single numbers only have been given, these represent the years in which the material was received. The place of origin of each specimen, together with the collector's name, has also been added wherever possible.

Aquilaria Agallocha *Roxb.* (Thymelaeaceae). Fig. 1.

A very full account of the wood of this species is given by Hooper (7), from whose paper a great deal of the following information, apart from anatomical characters, has been drawn. An earlier account, with some anatomical characters, is also given by Moeller (9). *Aquilaria Agallocha* is a large tree native of the mountains east and south-east of Sylhet, and is found abundantly at Tenasserim in Burma. Usually the wood is light, pale and unscented, but in certain circumstances a resinous deposit is formed in the branches and trunk, and the specific gravity of the wood increases. The heavy wood thus formed is collected, and constitutes the drug known as "Agar." What causes the resin to be deposited is uncertain, but it is generally held that it appears after an injury has been sustained. The drug is sold in pieces which are very irregular in size and shape, varying from small splinters to pieces weighing about a pound. It is of interest that Hooper mentions a substitute for this wood which is imported to Bombay and Calcutta from Zanzibar. The botanical origin of this substitute was unknown when his paper was written (in 1904) but in the light of the present investigation it seems probable that it may well be the wood of *Cinnamosma fragrans* described below. (According to Watt, "Dictionary of Economic Products of India," Calcutta, 279 (1899), Guibourt suggested that *Excoecaria Agallocha* L. is also used as a substitute for *Aquilaria Agallocha*. Watt also mentions that "Taggar" and "False Aloes Wood" are imported to India from Zanzibar.) According to Hooper, the wood of this species appears to have been valued from the earliest times on account of its perfume and supposed medicinal properties. It is now used principally in China for burning as incense, and in the manufacture of joss-sticks. An oil known as "Aggar-Atta" is extracted from it at Sylhet. Other uses of the wood are stated to be (1) for the manufacture of rosaries, (2) for burning the dead bodies of Hindus, (3) as a preventive against fleas and lice, (4) taken internally as a stimulant and cordial in "gout, rheumatism and paralysis, and also as a stimulant astringent in diarrhoea and vomiting."

Wood Structure.

The most striking character clearly visible with a lens is the presence of dark-coloured areas throughout the wood. In transverse sections these appear as patches of varying size and shape, ranging from comparatively small circular areas to larger ones elongated tangentially, usually rounded at the narrow ends, but sometimes terminating in points. In the material available it was not possible to follow the mode of formation of these areas, but they appeared to consist largely of rather thick-walled parenchyma cells, almost all of which were completely filled with resinous material. Medullary rays were often incorporated in these patches. Moeller (l.c.) regarded them as intraxylary phloem. They varied in size from 0·25 mm. in a tangential direction and 0·12 mm. radially to 2·3 mm.

PLATE I

1. *Aquilaria Agallocha* Roxb. Indian Forestry Department, 1879. Transverse section. ×90.

2. *Excoecaria africana* Muell. Arg. Transvaal. J. Burtt-Davy. 52–1920. Transverse section. ×90.

3. *Euphorbia antiquorum* L. S. Jayeteleke, Ceylon. Transverse Section. ×90.

[*To face page* 4.

or more tangentially and 0·8 mm. radially. These resin-filled areas were not observed in any of the other woods under consideration except *Aquilaria malaccensis*, so they may be taken as a distinctive character of the genus *Aquilaria* for the purposes of the present paper. Intraxylary phloem was also present in samples of the normal wood which did not contain the valuable resin, but here the cells of which it was composed were devoid of contents and were not so clearly visible under a lens.

Pores thick-walled, sometimes solitary, but chiefly in short radial chains; considerable variation in the size of the individual pores, ranging from 24μ radial and 40μ tangential diameter to 100μ diameter in both directions. Deposits present in most of the vessels, especially the smaller ones. Vessel perforations simple. Intervascular pits minute, bordered. Parenchyma rare (apart from the patches already described). Rays predominantly uniseriate, sometimes biseriate for a part of their height, heterogeneous, all cells filled with dense contents, 1–29 cells (predominantly about 9 cells) high, individual cells 20–28μ high. Wood fibres (tracheids) with wide lumen, bordered pits small, unevenly distributed.

Trade and Local Names.

"Eagle wood," "Aloe wood," "Lignum aloes," "Pao Daguila-aloes wood," "Kulambak," "Aguila wood," "Aggar," "Tugge," "Agallochum xylo," "Paradise wood," "Linaloeholz," "Adlerholz," "Lignum agallochi," "Lignum aquila," "Lignum aquilariae," "Lignum aspalathi," "Xylaloe," "Kayu garu" (Malay), "Calambac," "Colombac," "Kalambac," "Kalumback," "Lign aloes."

Material Examined.

(1) "Lign aloes." Silhet. J. D. Hooker. (2) "Eagle wood." Indian Forestry Department, 1879. (3) Gologhat, Assam. Indian Forestry Department, 1878. (4) "Agar." India, 77–1900.

Aquilaria malaccensis *Lamk.* (Thymelaeaceae).

According to Heyne (6) *Aquilaria malaccensis* Lamk. is a tree 50–60 feet high and 1½ ft. thick, with a whiteish, smooth bark. It grows on high ground in the Malay Archipelago. The wood is white, light and soft unless it contains resin. It is stated that fallen trees sink into the ground, and in these circumstances the wood rots and the resin-containing portions are extracted. Heyne does not agree with the suggestion that the wood is deliberately buried in order to induce the formation of the resinous deposit, but mentions that the natives bore holes in the trunk in which they insert salt to assist in the production of resin. The bark yields a fibre used in the manufacture of ropes, loin-cloths, etc.

Wood Structure.

The wood is very similar to that of *Aquilaria Agallocha*, but features by which it may sometimes be distinguished from that

species are the relative rarity of solitary pores and the more frequent occurrence of large aggregates of vessels (up to 16 in a group). However, considerable variations were noted, so that it is inadvisable to rely too fully on these characters. It was not found possible to substantiate the conclusion of Moeller (l.c.) that *A. malaccensis* can be distinguished from *A. Agallocha* by having more strongly thickened elements, and by the possession of crystals in the parenchyma cells of the rays. On the other hand some support was found for the suggestion that biseriate rays are more frequent in *A. malaccensis* than in *A. Agallocha*.

Material Examined.

(1) Philippines. Imperial Forestry Institute 5271 and 5272. (2) Federated Malay States. Imperial Forestry Institute 5752. (3) Malacca. Kew Museum Y6421. (4) Cochin China, Paris Exhibition, 1878.

Excoecaria africana *Muell. Arg.—Spirostachys africana* Sond. (Euphorbiaceae). Fig. 2.

The wood of this species is of interest in this paper chiefly because it has been confused with that of *Cinnamosma fragrans* Baill., a description of which is given below. The confusion appears to have arisen primarily on account of the strong superficial resemblance of the wood of the two species, which in turn probably led to a certain specimen in the Kew Museums being incorrectly labelled some years ago. Reference is made to this piece of wood in Kew Bull. 1888, 136, where the following statement occurs: " In the Kew Museums there is a specimen of wood labelled ' *Santal Vert* (Croton sp.), exported from Madagascar and Zanzibar into India, where it is said to be used for burning the bodies of Hindoos.' " This specimen, still in the Kew collections, now proves to be identical with authentic material of *Cinnamosma fragrans* Baill., kindly supplied by Prof. S. J. Record from the wood collections of the Yale University School of Forestry. Later, other specimens from East Africa and Zanzibar came into the Kew collections, and presumably on account of their very strong superficial resemblance to the specimen of " Santal Vert " already mentioned, were believed to be species of *Croton*. During the present investigation it has been found that the dark-coloured, heavy, hard woods from East Africa and Zanzibar in the Kew collections labelled *Croton* sp. are some of them *Cinnamosma fragrans*, whilst the remainder agree with authentic material of *Excoecaria africana*.

This species is used as a substitute for Aloes wood, and in the manufacture of necklaces, charms, gunstocks, furniture, wagon work and ox yokes, and for placing amongst clothing to keep away moths.

Wood Structure.

A description of the wood of *Excoecaria africana* and its source and uses has been given by Burtt-Davy (2). For the sake of completeness the description of the wood is here repeated verbatim.

" Heartwood dark brown, beautifully marked with darker streaks, sometimes becoming almost black ; a highly ornamental wood ; has a waxy appearance and feel. Sapwood much lighter in color. Scent strong and persistent, resembling that of Cedar and Sandal. Taste somewhat acrid.

" Very hard and heavy ; weight 50–62 pounds per cu. foot, oven-dry ; of very fine and uniform texture ; rather difficult to work because of its hardness, but finishing very smoothly and taking a natural waxy polish ; is very durable.

" According to Scott [South African Journ. Sci. xxiv. 313 : 1927] the ' solution in water is pale green ' ; wood burns well and easily, leaving a pure white ash and exuding a sticky treacle-like substance.

" *Gross Anatomy.* Growth rings poorly defined ; the darker bands which suggest growth rings are independent of seasonal variations. Pores very small and indistinct, fairly numerous but not crowded, arranged in short radial rows of two to five, mostly filled with dark gummy deposits. Vessel lines very fine, but distinct. Rays minute, barely visible with a hand lens on cross and tangential sections, low and inconspicuous on the radial.....

" *Minute Anatomy.* Growth rings defined by slight difference in density. Pores thick-walled, sub-circular or radially flattened, arranged in rows of two to several pores each, sometimes appearing sub-divided ; vessel perforations simple ; pits numerous, fairly large, the appertures elongated ; dark red masses of gum abundant. Parenchyma in fairly numerous, uniseriate, irregular and broken tangential lines ; dark infiltrates common. Rays 7–25 cells deep and 1 or 2 cells wide, mostly uniseriate ; somewhat heterogeneous, the larger cells usually marginal ; dark infiltrates common ; pits into vessels of same appearance as those between vessels. Wood fibres very slender, thick-walled, indistinctly pitted, arranged in definite radial rows. Most of the elements of the wood contain oil globules."

The structure described above agrees closely with that seen in the specimens available for comparison. However, exception must be taken to the suggestion of Scott that " the solution in water is pale green." Whether this is true when the wood is fresh I am not in a position to say, but repeated experiments with the available material failed to give a positive result. In fact a means of distinguishing *E. africana* from *Cinnamosma fragrans* was found to be that an aqueous infusion of the former was colourless, whereas that of the latter gave a yellowish-green, fluorescent liquor.

Local and Trade Names (chiefly from Burtt-Davy's paper).

" Tomboti," " um Tomboti," " Sandalwood," " Sandalo," " Helengomaash " or " Shelinga maash," " Muconite," " faux bois d'aigle," " faux bois de calambac," " faux bois de calambounc," " adlerholz," " agelhout," " agalloche," "bois d'agalloche," " Pao d'aquilla," " calambac."

Material Examined.

(1) "Tamboti Wood." Transvaal. J. Burtt-Davy, 52–1920.
(2) "Tambotie-boom." Transvaal. J. Burtt-Davy, 86–1906.
(3) Portuguese East Africa. J. Gardner and Sons, 1916.
(4) "Ntomboti." Swaziland. Brit. Emp. Exhib. 120–1924.
(5) "African Green Sandalwood." J. Heathcote, 14–1886.
(6) "Muconti." Livingstone, 1860.
(7) "Mukunti." E. Africa. Kirk, 1864.

Excoecaria Agallocha *L.* (Euphorbiaceae).

According to Heyne (6) this tree grows on the south-east coast of Asia and in tropical Australia. In certain unfavourable circumstances, as for instance when trees are growing in situations where they are liable to be splashed by sea water or scorched by the sun, a resinous deposit is formed in the wood. The resinous parts of the wood have been used from an early date as a substitute for those of *Aquilaria Agallocha*, and also as an adulterant in samples of other scented woods. An oil, which is used to cure skin diseases, is distilled from the wood.

Bentham and Hooker (Gen. Plant. iii. 337) confused *Excoecaria Agallocha* L. with the African species *E. africana* Muell. Arg. This was an error which may well have led to the wood of both species being confused. However the position was made worse when, presumably on account of their strong superficial resemblance, the wood of *Cinnamosma fragrans* Baill. was mistaken for that of *Excoecaria africana*. The wood of *Excoecaria Agallocha* has thus been confused not only with that of *Aquilaria Agallocha* Roxb. because of its use as a substitute for that species, but also with that of *Excoecaria africana* as a result of a wrong identification. Actually there is no apparent reason why the wood of the two species of *Excoecaria* here described should be confused, as their general appearance is quite different when they are seen together. Thus, whereas the wood of the African species is very hard and dark in colour, that of *E. Agallocha* is very soft, white and spongy.

Wood Structure (with special emphasis on the differences from *E. africana*).

The wood differs from that of *E. africana* in having no dark-coloured heartwood, and in being very soft and spongy. Pores clearly visible with a lens, in short radial chains as in *E. africana*, but differing in not being filled with gummy deposits. The fine rays and parenchyma both just visible with a hand lens.

Growth rings absent. General arrangement and shape of pores similar to those of *E. africana*. The two species agree in having vessels with simple perforations, short segments, and numerous fairly large bordered pits with slit-like apertures. On the other hand no red deposits were noted in the vessels. Parenchyma arranged in tangential lines as in *E. africana*, but (at least in one specimen) less abundant. Darkly staining deposits present in a

4. *Gonystylus bancanus* (Miq.) Baill. Buitenzorg. Dr. Scheffer. Transverse section. ×72.

5. *Gonystylus bancanus*. Tangential section. ×72.

6. *Gonystylus bancanus*. Radial section. ×72.

[To face page 8.

few of the parenchyma cells. Rays almost exclusively uniseriate, but a few partly biseriate, 1–20 (mostly 3–10, seldom exceeding 15) cells high, somewhat heterogeneous, very rarely with dark infiltrates in the cells; solitary crystals present in many cells. Wood fibres (tracheids) very different from those of *E. africana*, the walls being scarcely thickened, with small, crossed bordered pits.

Material Examined.

(1) Hong Kong. C. Ford, 61–1884. (2) Sundarbans, Bengal. Indian Forestry Department, 1878 (this specimen was at one time examined by J. S. Gamble).

Euphorbia antiquorum *L.* (Euphorbiaceae). Fig. 3.

The wood of this species is sometimes sold in the East under local names which have led to its being confused with other scented woods described in this paper. A description of it is therefore given. The material available for study was very cross grained, so that it was found difficult to make out some of the characters, for which reason the description which follows is rather incomplete. Specimens of this wood received from Bangkok were chiefly in the form of irregular-shaped pieces similar to the resin-containing portions extracted from *Aquilaria Agallocha*. Very little definite information concerning the uses of this wood has been found, but there seems no doubt from the information supplied by Dr. Kerr that it is used, at all events to some extent, as a substitute for the more valuable scented woods.

Wood Structure.

Wood light, colour yellowish-brown or darker, no differentiation into heart and sap wood, although more darkly coloured patches occurred sporadically. Pores very infrequent, scarcely visible with a lens. Rays densely crowded, likewise indistinct with a lens. With a microscope the pores were seen to be mostly solitary, but sometimes in radially-arranged groups of two or three, rounded or angular; sometimes the radial diameter was greater than the tangential. Maximum diameters observed 64μ by 54μ (mostly about 53μ by 37μ). Walls of vessels moderately thick, thickening and perforations scalariform. Vessels often filled with darkly staining contents. Parenchyma paratracheal, but also diffuse. Fibres (tracheids) with wide lumina, in places completely plugged with a substance that stained readily with safranin. Bordered pits minute. Rays chiefly uniseriate or locally biseriate for a part of their height, usually heterogeneous, 1–10 (mostly 1–4) cells high. The nature of the ground tissue seemed to vary in the different samples of material available. In some it was composed of fibres as described above, whilst in other samples it was softer, the lumina of the cells were wide, and they were definitely of the nature of tracheids. The frequency in the occurrence of partially biseriate rays also varied, as did the shape of the individual cells composing them. In the light of these variations it seems possible that more than one species of *Euphorbia* is

concerned, but until further material is available it is impossible to settle this point.

Trade and Local Names.

" Kalamet," " Kalampak," " Galat dai," " Da-look."

Material Examined.

(1) " Kalampak," " Galat dai." Bangkok, 29–1929. (2) " Da-look." Ceylon. S. Jayeteleki. (3) Specimen from a tree destroyed by a cyclone in Calcutta Botanic Garden, 1864.

Gonystylus bancanus (*Miq.*) *Baill.—Gonystylus Miquelianus* T. et B. (Thymelaeaceae). Figs. 4–6.

Moeller (l.c.) records that the wood of *Gonystylus Miquelianus* T. and B. has been used as a substitute for that of *Aquilaria* sp. This is also confirmed by Heyne (6) who states that the " gara " wood sold in Java is usually that of *Gonystylus bancanus* Baill. The tree, according to Heyne, is a giant of the forest, being up to 145 ft. high and 3 ft. thick. It appears that under certain conditions the wood becomes filled with resin in much the same way as that of *Aquilaria* spp. The scented portions of the wood are stated to be bright yellow and soft, and to taste like caramels, but with a bitter after-taste. The portions of the wood containing the resin are extracted from felled trees and also from fallen trees that are lying about. The normal wood is used in the manufacture of walking sticks, small boxes, etc. In the present investigation only normal wood was available for study.

Wood Structure.

Wood yellow with greyish streaks and patches, moderately hard. Pores clearly visible with the naked eye, fairly uniformly distributed, but with a tendency to be in concentric zones. Ripple marks very clear on tangential surfaces.

Brief notes on the microscopical anatomy are given by Moeller (l.c.). His description, which agrees very closely with what I have observed, is here repeated and extended to include certain other characters made more obvious by the use of microtome preparations.

The groundwork of the wood is made up of tracheids, with slit-like bordered pits, scattered throughout which there are fairly numerous pores, sometimes solitary, but chiefly in short radial series, with vessel walls flattened where they are in contact with one another, predominantly 120μ in diameter in both directions, but sometimes smaller than this, or reaching 172μ by 120μ. Vessel perforations simple. Inter-vascular pits minute or slit-like. Parenchyma not very frequent, chiefly in short, broken, tangential bands, also circumvasal. Rays predominantly uniseriate, but sometimes also partly or wholly biseriate, 1–30 (mostly 5–15) cells high, heterogeneous ; solitary crystals frequently present in ray cells.

Plate III

7. *Cordia fragrantissima* Kurz. Burma. Indian Forestry Dept., 1878. Transverse section. ×72.

8. *Cordia fragrantissima*. Tangential section. ×72.

9. *Mansonia Gagei* J. R. Drumm. J. S. Gamble. Rangoon. 12 1902. Transverse section. ×90.

[*To face page* 10.

Local Names.

" Gara," " Kajoe garoe."

Material Examined.

(1) Buitenzorg, Java. Dr. Scheffer. (2) Philippines. Imperial Forestry Institute 1788.

Cordia fragrantissima *Kurz.* (Boraginaceae). Figs. 7 and 8.

According to Gamble (4) this tree occurs chiefly in the hills of Martaban and Tenasserim, and in Upper Burma. It is stated to be deciduous, and it has been suggested that the wood should be more widely used on account of its handsome grain and fragrant smell. It is on account of its scent that the wood has been included in the present paper. Also it has been confused with the wood of some of the other species here described on account of the similarity of some of their local names. It is used as a cosmetic by Burmese women. Mr. Burkill informs me that it is regarded as a superior wood to *Mansonia Gagei* for this purpose, the latter being a substitute for it used chiefly by people of a lower social standing. Only one specimen was available for examination in the Kew collections. This had the local name of " Toungkalamet," and was received from Burma through the Indian Forestry Department in 1878.

Wood Structure.

The gross features in the one specimen available agreed with the following description given by Gamble : " Wood moderately hard, reddish-brown with darker streaks, beautifully mottled. Pores moderate sized to large, in roundish patches, which are joined by occasional, broken concentric lines. Medullary rays rather distant, moderately broad, with a well-marked and rather handsome silver grain."

Groundwork of wood made up of fibres, mostly with a narrow lumen, and abundant terminal parenchyma. The latter is arranged in broad concentric bands, broken here and there, but elsewhere with a tendency to coalesce. The width of the parenchyma bands varied throughout their length (as shown in transverse sections), but they usually broadened out near the vessels, so that the latter were in most instances entirely surrounded by (circumvasal) parenchyma. The vessels were relatively large in diameter, 20μ–260μ (mostly 200–220μ), roughly circular, solitary (sometimes solitary ones were quite close together) or in groups of two or rarely more, the groups being roughly circular in outline. Nearly all the vessels were filled with tyloses. Pits in vessels small, bordered, fairly close together. Rays markedly heterogeneous, 1–6 (mostly 3–5) cells wide and 1–40 (mostly 17–27) cells high. A few solitary crystals were sometimes present in the medullary rays cells.

Local Names.

" Kalamet," " Toungkalamet."

Material Examined.

" Toungkalamet." Burma. Indian Forestry Department, 1878.

Mansonia Gagei *J. R. Drumm.* (Sterculiaceae). Figs. 9 and 10.

The wood of *Mansonia Gagei*, as stated above, is used in Burma as a substitute for the more valuable *Cordia fragrantissima*, which is used as a cosmetic. In a recent article Chowdhury (3) states that it is used as a substitute for true Sandalwood (*Santalum album*) but without stating for what purpose.

A description of the wood given by Gamble (5) has been repeated with minor alterations by Record (10). Another description of it has been given by Chowdhury (l.c.). The chief disagreement in these descriptions concerns the scent of the wood. Record states that the wood has no scent, whilst Chowdhury says that it is scented but less strongly than *Santalum album*. I have examined a number of specimens with apparently identical structure, but which vary in the extent to which they are scented, those that have been in the Kew collection only a comparatively short time being, as a rule, more strongly scented than specimens which have been there longer. Mr. Burkill informs me that when freshly felled the wood is not scented, but that the scent develops whilst the trees are decaying in the forest. A brief anatomical description is given here for the sake of completeness.

Wood Structure.

Growth rings visible, but poorly defined. Pores small, indistinct under a lens. Rays minute, numerous. Pronounced ripple marks present.

Pores thick-walled, sub-circular, mostly in radial rows. Diameter 40μ. Vessel perforations simple. Intervascular pits minute. Parenchyma in numerous, short, irregular, uniseriate lines. Rays mostly biseriate, a few uniseriate, mostly 16 cells high ; heterogeneous. Wood fibres thick-walled, pits small, inconspicuously bordered.

Trade Names.

" Sandalwood," " Mai chan," " Kalamet," " Chanchamot."

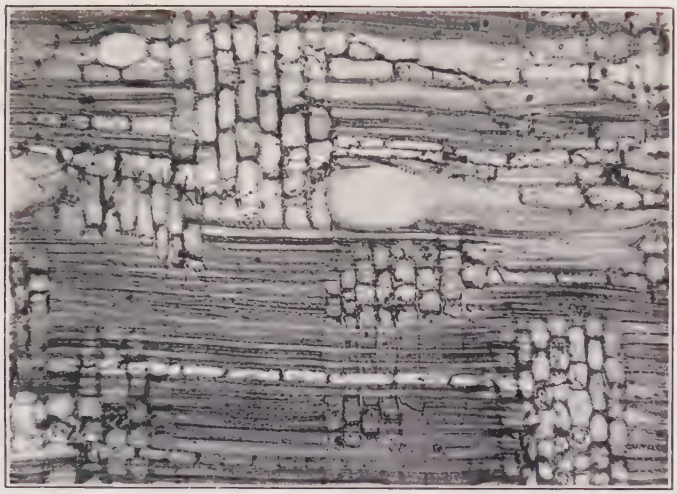
Material Examined.

(1) " Kalamet." Tenasserim. J. S. Gamble, 22–1906. (2) " Kalamet." Rangoon. J. S. Gamble, 12–1902. (3) Mandalay. F. N. Howes, 1928. (4) " Sandalwood " or " Siamese sandalwood." Singapore. (5) " Chanchamot." Kohlak, Siam.

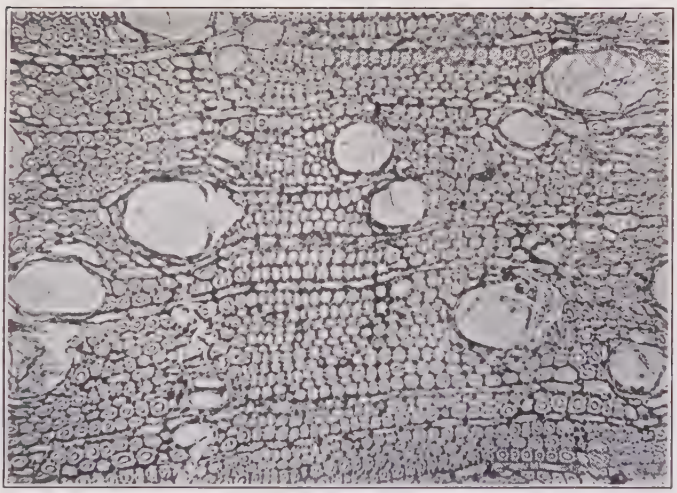
Cinnamosma fragrans *Baill.* (Canellaceae). Figs. 11 and 12.

This species could not have been described in the present paper had it not been for the kindness of Professor Record in supplying authentic material from the Yale collections. It was also due to Professor Record that my attention was drawn to the following notes in " Tropical Woods " (11) : " Canellaceae.—Secretory cells have

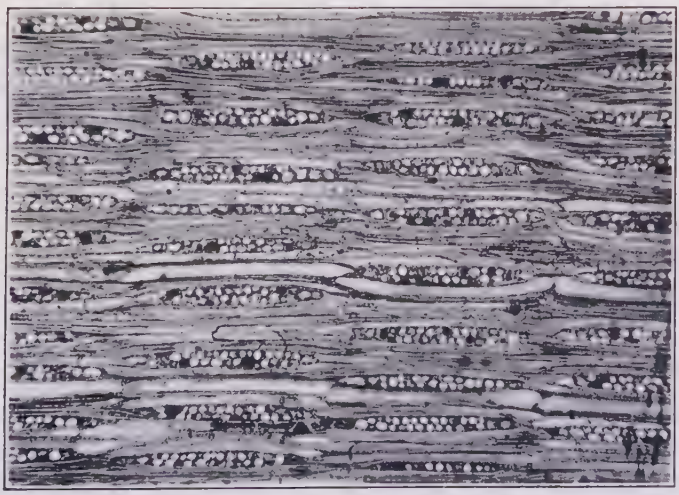
Plate IV



12. *Cinnamosma fragrans*. Radial section. ×90.



11. *Cinnamosma fragrans* Baill. Yale No. 7367. Transverse section. ×90.



10. *Mansonia Gagei*. Tangential section. ×90.

[*To face page* 12.

been found in the parenchyma strands and in the rays of *Cinnamosma fragrans* Baill., wood specimens of which were supplied by the Governor General of Madagascar and Dependencies. . . . The vernacular name of the tree is given as ' Metrobeantina.' This wood agrees in all important details with the ' taggar wood ' used by the Parsees of Bombay in religious ceremonies, judging from a specimen of this material supplied by Mr. Wilfred H. Schoff, secretary of the commercial museum of Philadelphia." The following remarks are also quoted in " Tropical Woods," l.c., from the " Report of the Museum of the Pharmaceutical Society of Great Britain," 1895–1902 (London, 1903, 42–45). " This dark wood is exported from the north of Madagascar (where the tree is known as ' hazo-mainty,' i.e. blackwood) to Zanzibar, whence it reaches Bombay. The vessels are usually isolated, their joints perforated in a scalariform manner, their walls have relatively large pits, and they are only sparingly surrounded with parenchyma fibres, which are either isolated, or form short transverse series between the fibre tracheids, which are thick-walled and furnished with large pits. Large oil cells, with yellow contents, are also present and the medullary rays consist of one or two rows of cells. The oil cells and scalariform vessels indicate that it is probably derived from a Lauraceous tree." The article in " Tropical Woods " then continues " The last statement fails to take into account the fact that the wood fibres of the Lauraceae have simple pits, while those of the Canellaceae are abundantly pitted with distinctly bordered pits."

I found that the wood of this species agreed not only with the above-mentioned so-called Crotons from Madagascar, etc., in the Kew collections, but also with a sample of " Calambac " sent from Kalantan, where it was bought in the market by a former hospital assistant of Dr. Gimlette. It is of interest that this wood from Madagascar is exported not only to Bombay but also reaches Kalantan. Mr. Burkill says there is evidence that it was traded in Siam as early as 1200 A.D., having been imported from the neighbourhood of Zanzibar.

A wood of unknown botanical identity was also described by Moeller in the paper on Aloes wood already mentioned (9), which, from the following description, seems clearly to be the same wood : " Taggar wood in Bombay, wie Aloëholz verwendet, über Madagaskar aus Zanzibar eingeführt.....Das Holz ist braun, an frischen Sägeflächen gelblich-grün, beinhart, gut spaltbar, geruchlos [!], beim Verbrennen eigenhümlich aromatisch. Der gefärbte Querschnitt lässt unter der Lupe die dicht gereihten Markstrahlen und zerstreute Pünktchen erkennen.

" Mikroskopischer Bau : Die Gefässe stehen zumeist einzeln, ihre Glieder sind leiterförmig perforirt, ihre Wand ist sehr dick und trägt relativ grosse Hoftüpfel. Sie sind von spärlichen Parenchymfasern begleitet. Solche finden sich auch vereinzelt oder in kurzen Querreihen zwischen den Fasertracheïden. Diese sind sehr derbwandig

und tragen ungewöhnlich grosse Hoftüpfel. Schon am Querschnitte fallen einzelne Parenchymzellen durch ihre Grösse und den citronengelben Inhalt auf. Dieselben erweisen sich auf Längsschnitten als Oelzellen. Die Markstrahlen sind ein- oder zweireihig; sie führen oft grosse Einzelkrystalle."

It is also suggested in the paper from which the above quotation is reproduced that the wood belongs to a Lauraceous tree, which, as pointed out in the reference quoted from "Tropical Woods," fails to take into account the fact that the pits of the wood fibres are bordered, whereas those in the Lauraceae are simple.

Wood Structure.

Wood hard and heavy. Colour varying in different specimens, but most material showing a strong superficial resemblance to *Excoecaria africana*. The specimen Yale No. 7367 lighter coloured than the others, but even this specimen almost black at the centre. Longitudinal surfaces with a distinctive yellow colour. Smell pleasant but faint, and always perceptible when the wood is boiled. An aqueous infusion of a few splinters in boiling water yellowish-green and fluorescent—a character distinguishing it from all the other species examined. Pores infrequent, mostly solitary but sometimes in pairs. Maximum diameters observed 100μ by 120μ, but mostly about 67μ by 88μ. Walls of vessels thick, with large pits. Perforations scalariform. Parenchyma circumvasal and diffuse, the latter isolated or with a tendency to be in short tangential lines. Fibres thick-walled, angular, with very pronounced bordered pits. A very characteristic feature was the large oil-cells, sometimes with yellow contents, which developed chiefly in the rays but sometimes in the parenchyma strands. Rays predominantly uniseriate, but sometimes partly or wholly biseriate, often with large crystals in the cells, up to 33 cells high.

Local Names.

"Santal vert," "Vohilahitra," "Calambac," "Hazo-mainty," "Metrobeantina," "Taggar wood."

Material Examined.

(1) S. J. Record, Yale 7367. (2) "Calambac" from the Market at Kalantan, 1931. (3) "Vohilahitra." Madagascar. G. F. Scott Elliot, 122–1891. (4) "Santal vert." Zanzibar. A very old specimen with no date received from the University of Louvain.

Concluding Remarks. In a note on "Kalamet" wood in the Bulletin of the Imperial Institute, 1906 (1), it is stated: "All that can be said at present is that there are recognised in Burma three kalamet woods, two native and one introduced. One of the Burmese plants is now known to be *Mansonia Gagei*; the sources of the other two kalamets have yet to be discovered."

It is hoped that the information collected together in the present paper may help to remove the obscurity that has for so long surrounded the botanical identity of these scented woods which are so

highly prized in the East. Mr. Burkill is uncertain whether the Aloes wood mentioned in the Bible was the wood of *Aquilaria Agallocha* or the one that has been recognised in this paper as that of *Cinnamosma fragrans*. There is historical evidence that the wood of both species has been prized from ancient times. It is possible that the coastal trade from East Africa to the Levant may have been developed before the overland trade from India. If this is so the original Aloes wood was probably that of *Cinnamosma fragrans* imported from Zanzibar. The exact sequence by which the remaining woods came on the market is difficult to say, but it seems probable that *Aquilaria Agallocha* and *A. malaccensis* were the earliest species to be imported in the Far East. *Cinnamosma fragrans* probably also reached the East from Zanzibar at an early date. Later on, owing to the value of these woods and the difficulty in obtaining them, others came to be used as substitutes. Doubtless the practice of unscrupulous traders of selling inferior wares in place of more valuable ones accounts for the greater part of the confusion that has arisen.

The writer wishes to express his thanks to all who have assisted in this investigation, especially to Professor S. J. Record, Mr. J. H. Holland, Mr. I. H. Burkill, the Director of the Forest Products Research Laboratory, Princes Risborough, for figures 1-3 and 9-12, and to Mr. G. Atkinson for figures 4-8.

Literature Cited.

1. *Bull. Imp. Inst. London*, iv. 67 (1906).
2. Burtt-Davy in *Tropical Woods*, no. 17, 15 (1929).
3. Chowdhury in *Indian Forester*, lvii. 53 (1931).
4. Gamble, *A Manual of Indian Timbers*, London, 1902.
5. Gamble in *Journ. Linn. Soc. Bot.* xxxvii. 262 (1904).
6. Heyne, *De Nuttige Planten van Nederlandsch Indie*, Batavia, 1927. (Information obtained chiefly from an unpublished English translation of the 1917 edition of this book.)
7. Hooper in *Agricultural Ledger*, no. 1 (1904).
8. *Kew Bulletin*, 1888, 136.
9. Moeller in *Pharmaceutische Post*, 1896, 1–40, and *ibid*, 1898, 1–28.
10. Record in *Tropical Woods*, no. 18, 53 (1929).
11. *Tropical Woods*, no. 1, 9 (1925).

IV.—ERAGROSTIS MAJOR AND E. MINOR.

T. A. Sprague and C. E. Hubbard.

The names *Eragrostis major* and *E. minor* were proposed in 1809 by Host (Ic. Gram. Austr. iv. 14, 15) for *Briza Eragrostis* L. and *Poa Eragrostis* L. respectively. Host, however, did not in 1809 supply

a diagnosis of his new genus *Eragrostis*, so that that name was not validly published by him. The valid publication of *Eragrostis* dates from 1812, when Palisot de Beauvois (Agrost. 70)—apparently quite independently—described a new genus, *Eragrostis* Beauv., basing it on *Poa Eragrostis* L., to which he gave the new name *Eragrostis poaeoides*. Beauvois also included seven other species in *Eragrostis*. He placed *Briza Eragrostis* L. in another new genus, *Megastachya*, based on *Poa mucronata* Beauv. Fl. Owar. i. 5, t. 4. The two genera *Eragrostis* Beauv. and *Megastachya* Beauv., were therefore roughly equivalent to *Eragrostis* Host., although *Megastachya* included species now assigned to other genera.

Host in 1827 (Fl. Austr. i. 135) gave a generic description of his *Eragrostis*, still including in it the two species *E. major* (*Briza Eragrostis*) and *E. minor* (*Poa Eragrostis*). *Eragrostis* Beauv., as so circumscribed, was accepted by Reichenbach (Consp. 54 : 1828), who recognized two Sections, *Eragrostis* (Beauv. sensu stricto), and *Megastachya* (Beauv.).

The nomenclatural status of the two binary combinations, *Eragrostis major* Host, and *E. minor* Host, now remains to be considered. These names were accepted for many years for the two species concerned. The question at once arises whether these names were validly published, since they appeared three years before a description of the genus *Eragrostis* was supplied by Beauvois. If they had been *new* species, their descriptions would have validated the *specific epithets*, as in the case of *Villebrunnea integrifolia* Gaud. and *V. crenulata* Gaud. (Voy. Bonite, Bot., Atlas, tt. 91, 92) ; the epithets *integrifolia* and *crenulata* are treated as having been validated by the accompanying plates with dissections, although the *generic* name *Villebrunnea* is not validated by these two plates. *Eragrostis major* and *E. minor*, on the other hand, were merely new names for the old species *Briza Eragrostis* and *Poa Eragrostis*. The only justification for changing the latter names was the transference of the species to a new genus *Eragrostis*, in which the retention of the specific epithet "*Eragrostis*" would have resulted in each case in the creation of the tautonym "*Eragrostis Eragrostis*." Until the *generic* name *Eragrostis* was validly published, however, such changes were inadmissible, and the names *Eragrostis major* Host (1809) and *E. minor* Host (1809) are therefore, in the writers' opinion, illegitimate.

The earliest specific epithet available under *Eragrostis* for *Briza Eragrostis* L. is *cilianensis* (*Poa cilianensis* All., 1785) ; and the earliest name available under *Eragrostis* for *Poa Eragrostis* L. is *Eragrostis poaeoides* Beauv. (1812).

The principal relevant references to the genus and to the two species concerned are given below.

Eragrostis *Beauv.* Agrost. 70, 162 (1812), emend. Reichb. Consp. 54, n. 1031 (1828), excl. spec. nonnull. *Eragrostis* Host, Ic. Gram. Austr. iv. 14, 15 (1809), sine descr. gener. ; Host, Fl. Austr. i. 135 (1827), descr. *Megastachya* Beauv. Agrost. 74, 167 (1812), partim.

Eragrostis cilianensis (*All.*) *Vignolo-Lutati* in Malpighia, xviii. 386 (1904); F. T. Hubbard in Philipp. Journ. Sci. viii. Bot. 159 (1913). *Briza Eragrostis* L. Sp. Pl. ed. 1, 70 (1753). *Poa cilianensis* All. Fl. Pedem. ii. 246, t. 91, f. 2 (1785). *Briza oblonga* Moench, Meth. Pl. 185 (1794). *Poa megastachya* Koel. Descr. Gram. 181 (1802). *P. Eragrostis* (L.) Brot. Fl. Lusit. i. 103 (1804). *Eragrostis major* Host, Gram. Austr. iv. 14, t. 24 (1809). *Megastachya oblonga* (Moench) Beauv. l.c. *Poa oblonga* (Moench) Baumg. Enum. Stirp. Transs. iii. 238 (1816). *Briza megastachya* (Koel.) Hort. ex Roem. et Schult. Syst. Veg. ii. 585 (1817), in syn. *Megastachya Eragrostis* (L.) Roem. et Schult. l.c. 575, 584. *Poa flexuosa* Roxb. Fl. Ind. i. 340 (1820). *P. Roxburghiana* Schult. Mant. Syst. Veg. ii. 314 (1824). *P. tortuosa* Spreng. Syst. Veg. i. 345 (1825). *Eragrostis megastachya* (Koel.) Link, Hort. Berol. i. 187 (1827). *Poa cachetica* Schumacher, Beskr. Guin. Pl. 66 (1827). *Eragrostis vulgaris* var. *megastachya* (Koel.) Coss. et Germ. Fl. Env. Paris, 641 (1845). *E. flexuosa* (Roxb.) Steud. Syn. Pl. Glum. i. 266 (1854). *E. poaeoides* var. *megastachya* (Koel.) A. Gray, Man. Bot. North. Unit. States, ed. 2, 563 (1856). *E. minor* var. *major* (Host) Beck, Fl. Nied.-Öst. i. 88 (1890). *E. Eragrostis* (L.) MacMill. Metasperm. Minnesota Vall. 75 (1892). *E. megastachya* β *cilianensis* (All.) Aschers. et Graebn. Syn. Mitteleur. Fl. ii. Abh. i. 371 (1900). *E. minor* var. *megastachya* (Koel.) Burtt-Davy in Jepson, Fl. West. Midd. Calif. 60 (1901). *E. costata* F. Turner in Proc. Linn. Soc. N.S. Wales, xxx. 91 (1905). *E. vulgaris* subsp. *E. major* (Host) Rouy, Fl. France, xiv. 262 (1913). *E. articulata* De Wild. in Bull. Jard. Bot. Brux. vi. 58, t. 2 (1919). *E. Starosselskyi* Grossheim in Not. Syst. Herb. Hort. Bot. Petrop. iv. 18 (1923). *E. Schweinfurthiana* Jedwabnick in Mez, Bot. Archiv. v. 194 (1924).

Distrib. Mediterranean region, Tropical and South Africa, India. Now introduced and abundantly naturalized in America, Australia and elsewhere.

Eragrostis poaeoides *Beauv.* Agrost. 162 (1812). *Poa Eragrostis* Linn. Sp. Pl. ed. 1, 68 (1753). *Eragrostis minor* Host, Gram. Austr. iv. 15 (1809). *E. Eragrostis* (L.) Beauv. Agrost., Explic. Planch. 10, t. 14, fig. 11 (1812). *E. poaeformis* Link, Hort. Berol. i. 188 (1827). *E. vulgaris* var. *microstachya* Coss. et Germ. Fl. Env. Paris, 641 (1845). *E. megastachya* subsp. *poaeoides* (Beauv.) Husnot, Gram. France, Belg. 55 (1898). *E. minor* var. *typica* Beck, Fl. Nied.-Öst. i. 88 (1890). *E. vulgaris* subsp. *E. minor* (Host) Rouy, Fl. France, xiv. 263 (1913).

Distrib. Mediterranean region, Tropical Africa, India, N. Asia. Introduced and naturalized in many parts of the world, but not so commonly as *E. cilianensis*.

The name *Eragrostis multiflora* (Forsk.) Aschers. Fl. Prov. Brandenb. i. 841 (1864), in obs., non Trin. (1830) (*Poa multiflora*

Forsk. Fl. Aegypt.-Arab. 21 : 1775) is often cited as a synonym of *Eragrostis cilianensis* (All.) Vignolo-Lutati, and has occasionally been used for that species. A recent examination of the type, however, shows it to be a distinct species, closely allied to *Eragrostis chalcantha* Trin. It appears to be confined to south-west Arabia (Yemen).

Megastachya brizoides Beauv., which according to Niles and Chase (Contrib. U.S. Nat. Herb. xxiv. 182: 1925) was "probably meant for change of name of *Briza Eragrostis* L.," was a new combination for *Poa brizoides* Linn. f. (1781). In the index to Beauv. Agrost. (p. 174) the following entry occurs: "Poa Brizoïdes *Lin. Vid.* MEGASTACHYA." This seems conclusive. In the Index Kewensis *Poa brizoides* Linn. f. was correctly reduced to *Eragrostis brizoides* Nees.

The validity of the generic name *Eragrostis* Host (1809) and of the binary combinations *E. major* Host and *E. minor* Host has been investigated in response to a request from Dr. M. L. Fernald. The conclusions reached are put forward for the consideration of botanists, and in particular of the Executive Committee of Nomenclature, with a view to obtaining, if necessary, a ruling on this and similar cases. If the views outlined above are upheld, it seems desirable, in order to avoid misunderstanding in the future, that the principles on which they are based should be explicitly stated in the International Rules. They may be formulated as follows :

(1) If a generic name has not been validly published, the publication of *new combinations*, or of *new names* based on older ones, under that generic name, is not recognized as valid for purposes of priority. After valid publication of the generic name, such new combinations, if required under the Rules, must be made again.

(2) Names of *new species* published with descriptions under a generic name which has not been validly published, are recognized as validly published for purposes of priority of their specific epithets.

V.—CONTRIBUTIONS TO THE FLORA OF SIAM.*—ADDITAMENTUM XXXVIII.

Lasianthus aristatus *Craib* [Rubiaceae-Psychotrieae] ; inter species ramulis pilis longiusculis haud adpressis instructis, foliis basi haud cordatis et supra nisi ad costam glabris, et inflorescentia sessili ob nervos laterales utrinque 7 adscendentes et foliorum paginae inferioris indumentum haud adpressum distinguendus.

Frutex circa 1 m. altus (ex *Kerr*) ; ramuli primo compressi, subhirsuti, mox teretes, sparse hirsuti, olivacei vel fusco-olivacei, circa 3 mm. diametro. *Folia* oblonga vel suboblonga, apice acute acuminata, basi rotundata, saepissime parum obliqua, 8–12 cm. longa, 3·3–4·8 cm. lata, rigide chartacea, sicca viridia vel fuscescentia,

*Continued from *K.B.* 1932, 486.

subtus pallidiora, supra ad costam parcius hirsuta, aliter glabra, subtus ad costam nervosque laterales pilis divergentibus hirsuta et aliter brevius subhirsuta, nervis lateralibus utrinque 7 oblique adscendentibus cum costa supra conspicuis subtus prominentibus, nervis transversis inter se parallelis et approximatis supra plus minusve conspicuis subtus subprominulis, longius ciliata, petiolo ad 4 mm. longo dense subadpresse hirsuto suffulta ; stipulae ad 5 mm. longae, dorso adpresse hirsutae, longe ciliatae. *Inflorescentia* axillaris, sessilis ; bracteae 4 mm. longae, dorso hirsutae, ciliatae ; flores albi (ex *Kerr*). *Receptaculum* breve, atrum, sparse hirsutum. *Calycis* tubus 1 mm. longus, segmenta 5, inter se inaequalia, lanceolata vel deltoideo-lanceolata, circa 3 mm. longa, basi 1–1·75 mm. lata, dorso hirsuta, intra glabra, ciliata. *Corolla* extra basi excepta hirsuta ; tubus 6·5 mm. longus, intra apice villosus ; lobi 5, circa 4 mm. longi et 2 mm. lati, apiculati, supra villosi. *Filamenta* 1·5 mm. longa, ad corollae tubi apicem adfixa, glabra, antheris subaequilonga. *Ovarium* 5–6-loculare.

Krat, Kao Saming, under 50 m., edge of evergreen forest, *Kerr* 17,914.

Lasianthus bicolor *Craib* [Rubiaceae-Psychotrieae] ; a *L. longipedunculato* Parker ramulis et foliorum pagina inferiore haud glabris, pedunculo communi breviore, a *L. puberulo* Craib ramulis et foliorum pagina inferiore plus minusve pilosis haud puberulis distinguendus.

Frutex circa 0·5 m. altus (ex *Kerr*) ; ramuli sparse pilosi, mox teretes, cortice pallide viridi obtecti, lenticellis parvis. *Folia* oblongo-elliptica, apice acute acuminata, basi rotundata vel cuneata, saepe inaequilateralia, 10–12 cm. longa, 3·5–4·2 cm. lata, chartacea, sicca viridia, supra glabra, subtus praesertim ad nervos pilosa, costa supra conspicua subtus prominente, nervis lateralibus utrinque 8–9 supra impressis subtus prominentibus intra marginem anastomosantibus, nervis transversis inter se parallelis subtus prominulis, petiolo circa 2 mm. longo piloso suffulta ; stipulae late lanceolatae, 2 mm. longae, demum deciduae, dorso pilosae. *Pedunculi* axillares, 5–10 mm. longi, pilosi, pauciflori ; pedicelli breves. *Receptaculum* 1·5 mm. longum, glabrum. *Calyx* purpureus (ex *Kerr*) ; tubus brevis ; segmenta late lanceolata, 4 mm. longa, 1·5 mm. lata, pilis paucis instructa. *Corolla* alba (ex *Kerr*) ; tubus 4·5 mm. longus, extra pilis paucis adpressis instructus, intra parte dimidia inferiore glaber, superiore dense villosus ; lobi 4, circa 4 mm. longi et 1·5 mm. lati, extra pilis adpressis subsparse instructi, intra dense villosi. *Stamina* 4, filamentis brevibus ad corollae tubi apicem adfixis, antheris 2·5 mm. longis margine parce hirsutis. *Ovarium* 4-loculare, stigmatibus 4.

Mê Hawng Sawn, Doi Pêpo, 1000 m., evergreen forest, *Kerr* 6180.

Lasianthus brevidens *Craib* [Rubiaceae-Psychotrieae] ; a *L. Curtisii* King et Gamble foliis pro rata latioribus, calycis segmentis multo brevioribus recedens.

Frutex circa 1 m. altus (ex *Kerr*) ; ramuli pilis fulvis vel ferrugineis subadpressis dense tecti, circa 2 mm. diametro. *Folia* late elliptica, elliptico-rotundata, vel rarius ovata, apice acute acuminata, basi saepe parum inaequilateralia, late cuneata vel latere altero cuneata, altero rotundata, 5–7 cm. longa, 2·8–4 cm. lata, chartacea, sicca saepe brunnescentia, pagina superiore glabra, inferiore ad costam subadpresse hirsuta, aliter sparsius piloso-hirsuta, costa supra conspicua subtus prominente, nervis lateralibus utrinque 5–6 supra conspicuis subtus prominentibus arcuatis, nervis transversis inter se parallelis subtus prominulis, margine ciliolata, mox recurva, petiolo ad 5 mm. longo adpresse hirsuto suffulta ; stipulae lanceolato-deltoideae, circa 1 mm. longae, dorso adpresse hirsutae, diu persistentes. *Inflorescentia* axillaris, sessilis, bracteis inconspicuis, floribus albis (ex *Kerr*). *Receptaculum* breve, breviter hirsutum. *Calycis* tubus brevis, segmenta lanceolata, acuta, circa 1·25 mm. longa, extra longe hirsuta. *Corolla* extra hirsuta, tubo 6 mm. longo intra superne piloso, lobis 5 supra pilosis 3 mm. longis 1·75 mm. latis. *Antherae* 1·25 mm. longae. *Stylus* 6 mm. longus, glaber. *Fructus* subglobosus, 3 mm. diametro, parce adpresse hirsutus, calyce persistente coronatus.

Prachuap, Kao Luang, 700 m., evergreen forest, *Kerr* 10,833.

Lasianthus brevipes *Craib* [Rubiaceae-Psychotrieae] ; a *L. conspicuo* Ridl. pedunculo communi brevi evoluto, pedicellis receptaculo cum calyce longioribus recedit.

Frutex circa 1 m. altus (ex *Kerr*) ; ramuli glabri, primo compressi, sicco fusci, mox teretes, cortice subolivaceo obtecti. *Folia* elliptica, apice acute acuminata, basi cuneata vel rotundata, saepe inaequilateralia, ad 11·5 cm. longa et 4·8 cm. lata, chartacea, sicca plus minusve fuscescentia, subtus parum pallidiora, pagina utraque glabra, costa supra conspicua subtus prominente, nervis lateralibus utrinque 8–10 supra subprominulis subtus prominulis late arcuatis intra marginem anastomosantibus, paucis aliis tantum paulo tenuioribus additis, nervulis rete transverse elongatum pagina utraque conspicuum efficientibus, margine primo distanter ciliata, petiolo 5–8 mm. longo glabro supra canaliculato suffulta ; stipulae deltoideae, acutae, 1·5 mm. longae. *Inflorescentia* pedunculo communi circa 1 mm. longo apice parvi-bracteato suffulta ; pedicelli 2·5 mm. longi, subglabri ; flores albi (ex *Kerr*). *Receptaculum* 1 mm. longum, atrum, pilis paucis albis instructum. *Calyx* receptaculo paululo longior, parvi-denticulatus, extra pilis paucis albis instructus. *Corolla* extra superne puberula ; tubus 11 mm. longus ; lobi 4, supra pilosi.

Nakawn Sritamarat, Ban Natawn, under 50 m., by stream in evergreen forest, *Kerr* 15,641.

Lasianthus chartaceus *Craib* [Rubiaceae-Psychotrieae] ; a *L. stercorario* Blume, cui habitu subsimilis, stipulis multo minoribus recedit.

Ramuli graciles, fusci, cito teretes, dense adpresse puberuli. *Folia* anguste oblonga, oblonga, vel oblongo-oblanceolata, apice acute acuminata, basi oblique rotundata vel cuneato-rotundata, 8–12 cm. longa, 2·3–2·9 cm. lata, chartacea, sicca brunnea vel fusco-brunnea, subtus pallidiora, supra ad costam inconspicue pubescentia, mox puberula, aliter glabra, subtus ad costam nervosque puberula, costa supra conspicua subtus prominente, nervis lateralibus utrinque 12–14 supra conspicuis subtus prominulis, nervulis inter se sat distantibus subtus fere prominulis, petiolo 1–3 mm. longo densius breviter pubescente suffulta ; stipulae deltoideae vel oblongo-deltoideae, circa 2 mm. longae, diutius persistentes. *Fructus* vix 5 mm. diametro, sicco ater, puberulus, calycis segmentis 4 deltoideis 0·75 mm. longis coronatus, 5-locularis.

Trang, Kao Kao, towards Kuan Tang, *Rabil* 267.

Lasianthus Foxworthyanus *Craib* [Rubiaceae-Psychotrieae] ; a *L. Rabilii* Craib foliis parum tenuioribus paulo longius petiolatis subtus cinereo-viridibus, fructu minore recedens.

Frutex circa 3 m. altus (ex *Kiah*) ; ramuli pilis brevibus cinereis adpressis obtecti. *Folia* oblongo-lanceolata vel suboblonga, apice acuminata, summo apice aristata, basi cuneata, usque ad 16 cm. longa et 4·5 cm. lata, sicca supra viridia vel fusca, subtus saepissime cinereo-viridia, supra ad costae basem pilis paucis brevibus instructa, aliter glabra, subtus ad costam nervos nervulosque pilis adpressis pallidis et aliter pilis paucis inconspicuis instructa, costa supra impressa subtus prominente, nervis lateralibus utrinque 8–9 adscendentibus supra conspicuis subtus prominentibus, nervis transversis inter se parallelis et approximatis supra conspicuis vel subconspicuis subtus prominulis, petiolo ad 7 mm. longo adpresse pubescente supra canaliculato suffulta ; stipulae sublineares, 5 mm. longae, dorso adpresse pubescentes. *Infructescentia* axillaris, sessilis. *Fructus* fere 5 mm. longus, sicco ater, parce puberulus, calycis segmentis brevibus dorso adpresse pubescentibus coronatus.

Bachaw, *Kiah* 24,312.

Lasianthus incomptus *Craib* [Rubiaceae-Psychotrieae] ; a *L. Curtisii* King et Gamble foliis maioribus, calycis segmentis conspicue brevioribus recedit.

Frutex circa 1·5 m. altus (ex *Kerr*) ; ramuli pilis fulvo-ferrugineis subadpressis dense tecti, ad 3 mm. diametro. *Folia* oblongo-obovata, oblongo-elliptica vel rarius elliptica, apice acute acuminata, basi saepissime parum inaequilateralia, cuneata vel latere altero cuneata, altero rotundata, 7–12 cm. longa, 2·5–4·3 cm. lata, rigide chartacea, sicca viridia, subtus pallidiora, supra ad costae basem pilis paucis instructa, aliter glabra, subtus ad costam nervosque laterales indumento ei ramulorum simili instructa, aliter pilis brevioribus adpressis subsparse instructa, costa supra conspicua subtus prominente, nervis lateralibus utrinque 6–7 supra conspicuis subtus prominentibus, nervis transversis inter se parallelis et approximatis

pagina utraque plus minusve conspicuis, margine longius sparse ciliata, petiolo 2–4 mm. longo dense adpresse pubescente suffulta ; stipulae 3 mm. longae, dorso dense adpresse pubescentes. *Inflorescentia* axillaris, pauciflora, sessilis, bracteis inconspicuis, floribus albis (ex *Kerr*) ; alabastra hirsuta. *Receptaculum* breve, adpresse hirsutum. *Calycis* tubus brevis, segmenta 4–5, circa 1·5 mm. longa. *Corollae* tubus 4 mm. longus, intra superne pilosus, lobi 4–5, circa 2·5 mm. longi et 1 mm. lati, supra pilosi. *Stamina* 4–5, antheris 0·75 mm. longis. *Stylus* 5 mm. longus ; loculi 4–5.

Chantabun, Kao Soi Dao, 800 m., evergreen forest, *Kerr* 9618.

Lasianthus lineolatus *Craib* [Rubiaceae-Psychotrieae] ; a *L. Ridleyi* King et Gamble foliis supra lineolatis, nervis lateralibus magis numerosis recedens.

Frutex circa 1·5 m. altus (ex *Kerr*) ; ramuli primo compressi, dense tomentoso-hirsuti. *Folia* oblongo-elliptica vel oblongo-oblanceolata, apice acute acuminata, basi late cuneata vel rotundata, 8–13 cm. longa, 2·7–4·7 cm. lata, chartaceo-coriacea, sicca supra viridia, subtus brunnea, supra glabra, subtus ad costam nervosque densius subhirsuta, aliter sparsius hirsuta, costa supra conspicua vel subprominula subtus prominente, nervis lateralibus utrinque 11 adscendentibus supra conspicuis subtus prominentibus, nervis transversis inter se parallelis et approximatis supra plus minusve conspicuis subtus prominulis, nervulis subtus subconspicuis, margine recurva, petiolo ad 7 mm. longo indumento ei ramulorum simili obtecto suffulta ; stipulae ad 7 mm. longae, dorso dense adpresse hirsutae. *Inflorescentia* axillaris, sessilis ; bracteae conspicuae, angustae, exteriores ad 1·7 cm. longae, interiores circa 5 mm. longae, omnes hirsutae. *Receptaculum* breve, hirsutum. *Calycis* tubus brevis, segmenta 5, lanceolata, 3 mm. longa, 1·25 mm. lata, dorso hirsuta, longius ciliata. *Corolla* ante anthesin superne pilosa, tubo intra superne piloso. *Antherae* 1·5 mm. longae. *Stigmata* 5.

Surat, Kao Nawng, 1100–1200 m., evergreen forest, *Kerr* 13,284.

Lasianthus maculatus *Craib* [Rubiaceae-Psychotrieae] ; a *L. chinense* (Champ.) Benth., cui facie subsimilis, petiolis brevioribus, stipulis longioribus facile distinguendus.

Frutex circa 1·5 m. altus (ex *Kerr*) ; ramuli subsparse brevius pilosi, primo compressi, mox teretes, ad 2·5 mm. diametro. *Folia* saepissime oblongo-oblanceolata, apice acute acuminata, basi cuneata vel latere altero cuneata, altero rotundato-cuneata, 8–13 cm. longa, 1·8–4 cm. lata, chartacea, sicca supra plus minusve fuscescentia, subtus brunnea, supra ad costam sparse crispatim puberula, aliter glabra, subtus ad costam nervosque laterales adpresse pubescentia, aliter pilis brevibus subadpressis instructa, costa supra prominula subtus prominente, nervis lateralibus utrinque circa 13 supra conspicuis subtus prominentibus, nervis transversis inter se parallelis et sat distantibus pagina utraque subprominulis, nervulis rete gracile pagina utraque subconspicuum formantibus, margine sparse

longius ciliata, petiolo 2–4 mm. longo adpresse pubescente suffulta ; stipulae saepe diu persistentes, ad 9 mm. longae, dorso hirsutae. *Inflorescentia* axillaris, sessilis, pauciflora, bracteis inconspicuis ; alabastra extra breviter sparse hirsuta. *Receptaculum* adpresse pallide hirsutum. *Calycis* tubus brevis, segmenta vix 2 mm. longa, cum tubo extra adpresse hirsuta. *Fructus* albus (ex *Kerr*), sicco ater, ad 7 mm. longus, conspicue costatus, subglaber, calyce diu persistente coronatus, 4-locularis.

Kaw Chang, Klawng Mayom, 50 m., common in evergreen forest, *Kerr* 6817.

Lasianthus marginatus *Craib* [Rubiaceae-Psychotrieae] ; *L. Helferi* Hook. f. habitu similis sed ramulis et foliorum pagina superiore haud glabris, foliis basi haud cuneatis recedit.

Frutex circa 2 m. altus (ex *Kerr*) ; ramuli primo compressi, subferrugineo-hirsuti, cortice demum fusco-rubro obtecti, lenticellis haud conspicuis, ad 4 mm. diametro. *Folia* oblonga vel oblongo-oblanceolata, acuminata, summo apice acuta, basi oblique rotundata, rarius latere altero late cuneata, ad 9 cm. longa et 2·8 cm. lata, coriaceo-chartacea, supra ad costam hirsuta, aliter glabra, subtus ad costam nervosque laterales adpresse hirsuta et ad nervulos parce hirsuta, costa supra conspicua subtus prominente, nervis lateralibus utrinque 10 supra conspicuis subtus prominentibus, nervis transversis inter se parallelis et approximatis pagina utraque parum prominulis, longius ciliata, petiolo circa 3 mm. longo dense adpresse hirsuto suffulta ; stipulae lanceolatae, 8 mm. longae, persistentes, dorso adpresse hirsutae. *Inflorescentia* axillaris, pauciflora, sessilis, floribus albis (ex *Kerr*). *Receptaculum* 1 mm. longum, pilis paucis longiusculis instructum. *Calycis* tubus fere 2 mm. longus, extra pilis longiusculis sparse instructus, intra glaber, lobi inter se inaequales, tubo subaequilongi. *Corolla* extra parce hirsuta, tubo 6 mm. longo superne intra dense piloso, lobis 5 sublanceolatis 4 mm. longis ad 1·5 mm. latis inferne dense pilosis. *Filamenta* circa 2 mm. longa, ad corollae tubi apicem inserta, antheris 1·5 mm. longis ciliatis. *Ovarium* 5-loculare.

Chantabun, Makam, under 50 m., open evergreen forest, *Kerr* 9551.

Lasianthus penicillatus *Craib* [Rubiaceae-Psychotrieae] ; a *L. pergamaceo* King et Gamble stipulis deltoideis inter alia distinguendus.

Frutex circa 1 m. altus (ex *Kerr*) ; ramuli glabri, iuveniles compressi, sicci subfusci, mox substraminei vel subolivacei, circa 3 mm. diametro. *Folia* oblongo-elliptica vel oblongo-oblanceolata, apice acuminata, basi cuneata vel late cuneata, 16–22 cm. longa, 5–6·5 cm. lata, chartacea, pagina utraque glabra, costa supra conspicua subtus prominente, nervis lateralibus utrinque 14–16 pagina utraque prominulis late arcuatis, nervulis rete laxum pagina utraque subconspicuum efficientibus, ciliata, petiolo ad 8 mm. longo glabro suffulta ; stipulae deltoideae, circa 5 mm. longae, primo crassius

parce ciliatae. *Inflorescentia* axillaris, sessilis, ebracteata, floribus albis (ex *Kerr*). *Receptaculum* glabrum, 1 mm. longum. *Calyx* 1·25 mm. longus, subtruncatus, apice pauci-hirsutus. *Corolla* apice pauci-pilosa, aliter extra glabra ; tubus 5 mm. longus, intra apice pilosus ; lobi 3, ad 3 mm. longi et 2 mm. lati, supra pilosi. *Stamina* exserta, filamentis 1·25 mm. longis ad corollae tubi apicem adfixis, antheris 1·75 mm. longis. *Stylus* ad corollae tubi apicem attingens, stigmatibus tribus.

Krabi, Tambon Kao Panom, 100 m., evergreen forest, *Kerr* 18,827.

Lasianthus puberulus *Craib* [Rubiaceae-Psychotrieae] ; a *L. longipedunculato* Parker ramulis foliisque haud glabris, pedunculo communi multo breviore inter alia distinguendus.

Frutex sarmentosus, circa 3 m. altus (ex *Kerr*) ; ramuli adpresse puberuli, luteo-virides, lenticellis inconspicuis. *Folia* oblongo-elliptica, late lanceolata, vel ovato-lanceolata, apice subacuminata vel acuminata, costa excurrente primo longius apiculata, basi cuneata vel rotundata, haud rarius acuminata et inaequilateralia, 4·5–9·5 cm. longa, 1·5–3·5 cm. lata, rigide chartacea, sicca viridia, subtus parum pallidiora, supra glabra, subtus ad costam nervosque sparse subadpresse longius puberula, costa supra conspicua subtus prominente, nervis lateralibus utrinque 4–5 supra conspicuis subtus prominentibus supremis intra marginem longius prorsus directis, nervis transversis approximatis inter se parallelis pagina utraque plus minusve conspicuis, petiolo 5–7 mm. longo longius adpresse puberulo supra canaliculato suffulta ; stipulae diu persistentes, paulo ultra 1 mm. longae. *Pedunculi* axillares, ad 1 cm. longi, indumento ei ramulorum simili tecti. *Fructus* 6 mm. diametro, longitudinaliter 5-sulcatus, sicco fuscus, parce adpresse puberulus, calycis segmentis linearibus 5 mm. longis coronatus.

Krat, Kao Kuap, 600 m., evergreen forest, *Kerr* 17,735.

Lasianthus Rabilii *Craib* [Rubiaceae-Psychotrieae] ; a *L. Hookeri* C. B. Clarke ex Hook. f. foliis minoribus brevius acuminatis recedit.

Frutex ramulis pilis brevibus ferrugineis adpressis obtectis. *Folia* saepissime oblonga, oblongo-oblanceolata vel elliptico-oblanceolata, apice acuminata, summo apice aristata, basi inaequilateralia, latere altero cuneata, altero late cuneata vel rotundato-cuneata, rarissime subaequaliter cuneata, 7–13 cm. longa, 2·8–4·7 cm. lata, chartacea, sicca supra plus minusve fuscescentia, subtus viridia vel parum brunnescentia, supra glabra, subtus ad costam nervos nervulosque pilis pallidis adpressis vel plus minusve divergentibus subhirsuta, costa supra saepissime impressa subtus prominente, nervis lateralibus utrinque 6–7 supra conspicuis subtus prominentibus, nervis transversis inter se parallelis et approximatis supra interdum conspicuis subtus prominulis, petiolo ad 5 mm. longo indumento ei ramulorum simili obtecto supra canaliculato suffulta ; stipulae circa 3 mm. longae, dorso adpresse hirsutae. *Infructescentia*

axillaris, sessilis. *Fructus* circa 7 mm. longus, calyce persistente circa 1·5 mm. longo coronatus.

Trang, Kao Kao, edge of forest, *Rabil* 364.

Lasianthus sarmentosus *Craib* [Rubiaceae-Psychotrieae]; a *L. inconspicuo* Hook. f. foliis tenuioribus, petiolis brevioribus, floribus paucioribus, et calycis segmentis conspicue brevioribus recedit.

Frutex tenuis, ad 3 m. altus (ex *Kerr*); ramuli graciles, 1·5–3 mm. diametro, nodos versus puberuli, aliter glabri. *Folia* saepissime elliptica vel oblongo-elliptica, caudato-acuminata, summo apice acuta, basi late cuneata vel rotundata, saepe parum inaequilateralia, 5–8·5 cm. longa, 1·8–2·8 cm. lata, chartacea, sicca viridia, subtus pallidiora, supra glabra, subtus matura ad costam nervosque laterales puberula, aliter glabra, costa supra impressa subtus prominente, nervis lateralibus utrinque 4–5 arcuatis supra conspicuis subtus prominentibus, nervulis supra subconspicuis subtus conspicuis, primo ciliolata, petiolo 2–3 mm. longo puberulo supra canaliculato suffulta; stipulae 1 mm. longae, diu persistentes. *Inflorescentia* axillaris, sessilis, pauciflora, floribus albis (ex *Kerr*), bracteis inconspicuis. *Receptaculum* 0·5 mm. longum, glabrum. *Calycis* tubus 0·25 mm. longus, segmenta deltoidea, subacuta, 0·75 mm. longa. *Corollae* tubus 3·5 mm. longus, intra apice parce pilosus, lobi 4, oblongi, 3 mm. longi, 1·5 mm. lati, sparse longius ciliati. *Antherae* paulo exsertae, 1 mm. longae.

Chantabun, Kao Soi Dao, 500 m., evergreen forest, *Kerr* 9614.

Lasianthus saxorum *Craib* [Rubiaceae-Psychotrieae]; a *L. andamanico* Hook. f. eiusque affinioribus foliis multo minoribus facile distinguendus; *L. lucido* Blume habitu subsimilis sed ramulis haud glabris et calycis lobis multo brevioribus recedit.

Frutex parvus (ex *Kerr*); ramuli dense breviter adpresse subflavo-puberuli, graciles, ad 1·5 mm. diametro. *Folia* oblongo-elliptica, oblongo-lanceolata, vel oblongo-oblanceolata, apice caudato-acuminata, aristata, basi cuneata, saepe parum obliqua, ad 8·5 cm. longa et 2·3 cm. lata, rigida, supra glabra, subtus ad costam nervosque subadpresse pubescentia, ad nervulos pilis paucis instructa, costa supra conspicua subtus prominente, nervis lateralibus utrinque 5–6 supra conspicuis vel fere obscuris subtus prominentibus intra marginem adscendentibus, nervis transversis subtus prominulis, margine revoluta, petiolo ad 4 mm. longo indumento ei ramulorum simili tecto suffulta; stipulae deltoideae, 1·5 mm. longae. *Inflorescentia* axillaris, pauciflora, sessilis, floribus albis (ex *Kerr*), bracteis haud evolutis. *Receptaculum* breviter adpresse pubescens, circa 1 mm. longum. *Calycis* tubus 0·5 mm. longus, lobi deltoidei, tubo subaequilongi, cum tubo dorso breviter adpresse pubescentes. *Corolla* extra sparse adpresse albo-pubescens; tubus 3 mm. longus, intra superne pilosus; lobi 5, elliptici, acuminati, 2·5 mm. longi, 1·5 mm. lati, supra breviter pilosi. *Filamenta* 0·5 mm. longa, ad corollae tubi apicem adfixa, antheris subaequilonga. *Stylus* corollae

tubo paululo longior ; ovarium 5-loculare. *Fructus* 3·5 mm. diametro, fuscus, puberulus.

Lôi, Kao Krading, 1100 m., on rocks in light evergreen, *Kerr* 20,055.

Lasianthus scalaris *Craib* [Rubiaceae-Psychotrieae] ; *L. Ridleyi* King et Gamble et *L. velutino* Ridl., subsimilis sed foliorum paginae inferioris pilis duriusculis et adpressis inter alia distinguendus.

Frutex circa 1 m. altus (ex *Kerr*) ; ramuli adpresse hirsuti, primo compressi, mox teretes. *Folia* elliptica, apice acute acuminata vel cuspidato-acuminata, basi parum inaequilateralia, late cuneata vel rotundata, 10–15 cm. longa, 4–7 cm. lata, rigide chartacea, sicca supra fusca vel viridia, subtus viridia, supra ad costae imam basem adpresse hirsuta, aliter glabra, subtus ad costam adpresse hirsuta, et ad nervos nervulosque brevius adpresse hirsuta, costa supra parum impressa subtus prominente, nervis lateralibus utrinque 7–9 supra conspicuis vel subprominulis subtus prominentibus arcuatis, nervis transversis inter se parallelis et approximatis supra subprominulis subtus prominulis, margine recurva, petiolo 10–17 mm. longo adpresse hirsuto supra canaliculato suffulta ; stipulae circa 7 mm. longae et 4·5 mm. latae, dorso adpresse hirsutae. *Inflorescentia* axillaris, sessilis, conspicue bracteata, floribus albis (ex *Kerr*) ; bracteae ad 9 mm. longae, hirsutae. *Receptaculum* 1 mm. longum, parce hirsutum. *Calycis* tubus 0·75 mm. longus, segmenta 5, anguste deltoidea, 1 mm. longa, praecipue apice extra longe hirsuta. *Corolla* extra superne hirsuta, tubo fere 6 mm. longo intra apicem versus piloso, lobis 5 circa 2 mm. longis supra pilosis. *Stamina* 5, antheris 1·25 mm. longis filamentis brevibus.

Krabi, Tambon Kao Panom, 200 m., evergreen forest, *Kerr* 18,809.

Lasianthus setosus *Craib* [Rubiaceae-Psychotrieae] ; a *L. Wallichii* (Wight et Arn.) Wight foliis supra haud glabris inter alia facile distinguendus.

Frutex circa 1 m. altus (ex *Kerr*) ; ramuli setis elongatis basi incrassatis subsparse instructi, olivacei vel straminei, circa 2 mm. diametro. *Folia* oblonga, apice acute acuminata, basi oblique truncata, cordatula, ad 8 cm. longa et 3 cm. lata, rigide chartacea, pagina utraque ad costam setis elongatis subsparsis et inferiore ad nervos laterales sparsis instructa, costa supra conspicua subtus prominente, nervis lateralibus utrinque 10 supra conspicuis subtus prominentibus intra marginem anastomosantibus inferioribus patulis, nervis transversis subtus saepissime prominulis, longius rigide ciliata, petiolo ad 2 mm. longo suffulta ; stipulae deltoideae, 2·5 mm. longae, diutius persistentes, saepissime mox plus minusve reflexae, longe rigide ciliatae. *Fructus* parum compressus, 5 mm. longus, 7 mm. latus, ater, glaber, calyce persistente brevi coronatus.

Ranawng, Kao Talu, 50 m., evergreen forest, *Kerr* 11,827.

Lasianthus subaureus *Craib* [Rubiaceae-Psychotrieae]; a *L. andamanico* Hook. f. foliis stipulisque angustioribus, petiolo duplo longiore inter alia facile distinguendus.

Frutex ad 3 m. altus (ex *Kerr*); ramuli pilis brevibus adpressis primo subaureis obtecti, ad 3 mm. diametro. *Folia* oblongo-lanceolata, apice acute acuminata, basi conspicue parumve inaequilateralia, latere altero acuminata vel cuneata, altero cuneata vel rotundato-cuneata, usque ad 17 cm. longa et 3·7 cm. lata, subcoriacea, sicca supra nitida, saepissime parum lutescentia, subtus brunnescentia, supra ad costam basem versus tantum pilis paucis adpressis instructa, aliter glabra, subtus ad costam nervosque laterales pilis brevibus adpressis dense vel subdense instructa et ad nervulos puberula, costa supra conspicua vel parum impressa subtus prominente, nervis lateralibus utrinque 12 supra conspicuis subtus prominentibus costam prope arcuatis dein adscendentibus, nervulis rete laxum pagina utraque subprominulum efficientibus, margine recurva, petiolo ad 12 mm. longo pilis brevibus adpressis dense tecto supra canaliculato suffulta; stipulae diu persistentes, 2·5 mm. longae. *Inflorescentia* axillaris, pauciflora, floribus albis (ex *Kerr*), bracteis minutis. *Receptaculum* breve, pilis brevibus pallidis adpressis instructum. *Calycis* tubus circa 2 mm. longus, apice parvidenticulatus, extra pilis iis receptaculi similibus instructus. *Corolla* extra pubescens, tubo 12 mm. longo intra superne piloso, lobis 6 linearibus vel lineari-lanceolatis acutis circa 5 mm. longis et 1·75 mm. latis supra pilosis. *Filamenta* brevia, antheris 2·25 mm. longis paululo exsertis apice et basi pilis paucis instructis. *Stylus* 7 mm. longus, stigmatibus 6 angustis.

Adang, 400 m., evergreen forest, *Kerr* 14,117.

Lasianthus subcalvus *Craib* [Rubiaceae-Psychotrieae]; a *L. constricto* Wight ramulis foliisque glabris vel fere glabris, foliis maioribus recedens.

Frutex circa 1·5 m. altus (ex *Kerr*); ramuli glabri, iuventute sicci fusci, compressi, mox substraminei, teretes, circa 3·5 mm. diametro. *Folia* oblongo-elliptica, elliptica, vel lanceolato-ovata, apice acute acuminata, basi parum inaequilateralia, late cuneata vel latere altero late cuneata, altero rotundata, ad 23 cm. longa et 7·3 cm. lata, rigide chartacea, sicca subviridia, subtus pallidiora, glabra, costa supra prominula subtus prominente, nervis lateralibus utrinque 7–9 supra conspicuis subtus pallidis prominentibus, nervis transversis inter se parallelis supra plus minusve conspicuis subtus pallidis prominulis, petiolo 8–13 mm. longo suffulta; stipulae 1·5 mm. longae, dorso pubescentes. *Inflorescentia* axillaris, sessilis, bracteis inconspicuis; flores albi (ex *Kerr*). *Calycis* segmenta 4, circa 1 mm. longa. *Corollae* tubus 9 mm. longus, lobi 4, supra pilosi. *Fructus* fusiformis, sicco ater, 1·2 cm. longus, subglaber, calyce persistente coronatus.

Trang, Kao Soi Dao, 400 m., evergreen forest, *Kerr* 19,421.

Lasianthus virgatus *Craib* [Rubiaceae-Psychotrieae] ; ab affini *L. glaberrimo* Ridl. ramulis haud glabris facile distinguendus.

Frutex circa 1·5 m. altus (ex *Kerr*) ; ramuli graciles, circa 2 mm. diametro, primo pilis brevibus sparse instructi, mox glabri, cortice fusco vel cinereo obtecti. *Folia* elliptica vel oblonga, apice caudato-acuminata, subacuta, basi cuneata vel late cuneata, haud rarius parum inaequilateralia, latere altero cuneata, altero late cuneata vel rotundata, circa 6·5 cm. longa et 2 cm. lata, sicca viridia vel parum fuscescentia, subtus pallidiora, pagina superiore glabra, inferiore ad costam pilis paucis instructa, demum fere glabra, costa supra impressa, subtus prominente, nervis lateralibus utrinque 8–9 pagina utraque prominulis intra marginem anastomosantibus, nonnullis aliis tantum paulo tenuioribus saepissime interiectis, nervulis rete laxum pagina utraque subprominulum efficientibus, praecipue apicem versus primo longius pauperius ciliata, petiolo circa 3 mm. longo parce pubescente supra canaliculato suffulta ; stipulae 1 mm. longae, pauci-fimbriatae, dorso adpresse hirsutae. *Inflorescentia* axillaris, sessilis, bracteis minutis, floribus sessilibus. *Receptaculum* atrum, pilis paucis instructum, 1 mm. longum. *Calycis* segmenta 3–4, inter se aequalia vel inaequalia, ad 1·25 mm. longa, angusta, parce brunneo-hirsuta. *Corolla* extra apicem versus puberula, tubo 4 mm. longo intra apicem versus piloso, lobis 3 circa 1·75 mm. longis et 1·5 mm. latis supra pilosis. *Stamina* 3, filamentis antheris sub-aequilongis circa 0·5 mm. longis glabris ad corollae tubi apicem adfixis. *Discus* conspicuus. *Stylus* 6 mm. longus.

Trang, Kao Sung, 700 m., evergreen forest, *Kerr* 15,226.

Paederia hirsuta *Craib* [Rubiaceae-Paederieae] ; foliis supra hirsutis vel hispidulis et receptaculo glabro *P. calycinae* Kurz similis sed foliis subtus molliter tomentosis, calycis segmentis pro longitudine latioribus recedit.

Caules lignosi, glabrescentes, sulcati. *Folia* matura rotundato-elliptica vel late oblonga, basi cordata, 9–14 cm. longa, 7–11·5 cm. lata, sicca subviridia, subtus pallidiora, sat rigida, supra hirsuta vel hispidula, subtus molliter tomentosa, costa supra conspicua subtus prominente, nervis lateralibus utrinque 6 supra conspicuis subtus prominulis, nervulis approximatis subtus conspicuis, petiolo usque ad 11·5 cm. longo suffulta ; stipulae circa 5 mm. longae, deciduae vel subpersistentes. *Paniculae* axillares, infructescentes circa 8 cm. longae et 4 cm. latae, pedunculo rhachi et ramulis tomentellis. *Fructus* ambitu ovatus, compressus, stramineus, pyrenis atris pallide lineolatis circa 8 mm. longis et 6 mm. latis conspicue stramineo-marginatis.

Krabin, Bupram, 200 m., evergreen forest, *Kerr* 9824.

Paederia pallida *Craib* [Rubiaceae-Paederieae] ; foliis saepissime ovato-lanceolatis basi cuneatis sicco pallidis supra glabris subtus subtomentellis distincta.

Caules volubiles, glabri, mox stramineo-brunnei. *Folia* ovato-lanceolata angusteve elliptica, apice subacuminata, basi late cuneata, 5–17 cm. longa, 3·5–5·7 cm. lata, rigide chartacea, sicca pallescentia, supra glabra, subtus minute subtomentella, costa supra conspicua vel leviter impressa subtus prominente, nervis lateralibus utrinque 6–7 superioribus intra marginem longius prorsus currentibus supra plus minusve conspicuis subtus prominentibus, nervis transversis numerosis subtus prominulis, nervulis rete subtus prominulum efficientibus, petiolo usque ad 1·5 cm. longo supra canaliculato suffulta ; stipulae usque ad 9 mm. longae. *Paniculae* et axillares et terminales, infructescentes 3–16 cm. longae, 2–6 cm. latae, rhachi ramulisque puberulis. *Receptaculum* puberulum. *Calycis* segmenta deltoidea, obtusa, 1·25 mm. longa. *Corolla* haud visa. *Discus* columnaris, calyce paululo longior. *Fructus* ambitu elliptico-ovatus, stramineus, compressus, pyrenis 8 mm. longis 6 mm. latis atris pallide lineolatis late stramineo-marginatis.

Chiengmai, Mê Awn, 600 m., mixed forest, *Kerr* 4711.

Paederia pilosa *Craib* [Rubiaceae-Paederieae] ; a speciebus aliis receptaculo haud glabro et corolla extra pilosa ob caules et folia pilis longis pallidis instructa nequaquam tomentosa distinguenda.

Caules volubiles, primo longius pallide pilosi, mox glabrescentes, ad 3 mm. diametro, subherbacei. *Folia* lanceolata, anguste lanceolata, vel suboblongo-lanceolata, apice acuta, basi rotundata, truncata, vel cordatula, 4–11 cm. longa, 1–3 cm. lata, membranacea vel chartaceo-membranacea, sicca supra fusco-viridia, subtus viridia, pagina utraque pilosa, pilis ad costam paginae inferioris densioribus patulis, costa supra conspicua subtus prominente, nervis lateralibus utrinque 4–6 supra subconspicuis subtus subprominulis intra marginem anastomosantibus, nervulis pagina utraque plus minusve subconspicuis, petiolo 3–17 mm. longo dense patente piloso suffulta ; stipulae late deltoideae, circa 1·5 mm. longae. *Inflorescentia* et axillaris et terminalis, pedunculo communi circa 1 cm. longo incluso ad 2·5 cm. longa, pedunculis partialibus utrinque saepissime 2 ad 7 mm. longis, pedunculis cum rhachi longius pallide pilosis, floribus puniceis (ex *Kerr*) subsessilibus vel breviter pedicellatis. *Receptaculum* circa 1·5 mm. longum, breviter crispatim pilosum. *Calycis* segmenta 5, late lanceolata, 1 mm. longa. *Corolla* extra pilosa, tubo circa 7 mm. longo intra subsparse piloso, lobis brevibus. *Stamina* 5, inclusa, filamentis brevibus ad corollae tubi medium adfixis, antheris 2·25 mm. longis. *Stylus* 3·25 mm. longus, stigmatibus filiformibus 5·5 mm. longis.

Krabin, Bupram, 100 m., evergreen forest, *Kerr* 9823.

Rubia Garrettii *Craib* [Rubiaceae-Galieae] ; a *R. tibetica* Hook. f., cui habitu subsimilis, foliis petiolatis minus scabridis recedit.

Herba scandens ; caules laeves, angulati vel angustissime alati, ad 1·5 mm. diametro. *Folia* opposita, i.e. cum stipulis per 4 pseudo-verticillata, ovato-lanceolata, oblongo-lanceolata, vel rarius

lanceolata, apice acuta, breviter reflexa, basi cuneata vel rotundata, ad 2 cm. longa et 0·7 cm. lata, chartacea, sicca brunnea vel fusco-brunnea, subtus parum pallidiora, supra ad costam breviter setulosa, aliter glabra, subtus glabra, costa supra conspicua subtus prominula, trinervia vel subtriplinervia, nervis lateralibus pagina utraque praecipue inferne conspicuis, margine anguste revoluta, petiolo 2–11 mm. longo infra setis rigidis recurvis instructo suffulta ; stipulae foliis similes sed paulo minores. *Infructescentia* axillaris, plus minusve corymbiformis, ad 2 cm. diametro, pedunculo communi saepissime 1·5 cm. longo suffulta, glabra. *Fructus* ater (ex *Garrett*), vix maturus ad 5 mm. diametro, glaber.

Doi Angka, 2430 m., marsh, *Garrett* 325.

Scabiosa siamensis *Craib* [Dipsacaceae] ; ab affini *S. Hookeri* C. B. Clarke pedunculis primo crispatim pubescentibus mox crispatim puberulis et foliorum indumento sparso brevi distinguenda.

Herba perennis, circa 30 cm. alta, radice lignosa. *Folia* radicalia, oblongo-oblanceolata vel oblanceolata, apice subobtusa, basi angustata, decurrentia, ad 13 cm. longa et 4·2 cm. lata, rigide chartacea, sicca plus minusve cyanea, pagina utraque ad nervos pilis sparsis crispatis instructa vel superiore fere glabra, costa supra conspicua subtus prominente, nervis lateralibus utrinque 6–8 supra conspicuis vel impressis subtus plus minusve prominentibus, nervulis paucis supra saepe impressis subtus conspicuis, margine regulariter vel irregulariter grossius serrata, petiolo lamina decurrente anguste alato ad 4 cm. longo suffulta. *Pedunculi* solitarii vel ad quattuor, ad 30 cm. alti, apice densius crispatim pubescentes, inferne crispatim puberuli. *Capitula* solitaria, floribus apertis inclusis ad 4 cm. diametro ; involucri bracteae ligulatae vel spatulato-ligulatae, apice rotundatae, ad 1·7 cm. longae et 0·5 cm. latae, breviter subadpresse pubescentes ; receptaculum pubescens ; bracteolae lanceolatae, inferne longe attenuatae, stipite incluso ad 9 mm. longae, 1·25 mm. latae ; involucellum sericeum, circa 5 mm. longum, lobis longioribus 1·3 mm. longis. *Calycis* setae 15, circa 7·5 mm. longae, barbellatae. *Corolla* alba (ex *Put*), extra pilosa, tubo ad 1 cm. longo, lobis 4 ellipticis 3·5 mm. longis 2·75 mm. latis. *Stamina* 4, filamentis apicem versus corollae tubi insertis 1 cm. longis. *Stylus* staminibus paulo brevior.

Doi Chiengdao, *Put* 411.

VI.—BOTANICAL TERMS IN PLINY'S NATURAL HISTORY. T. A. Sprague.

The most varied estimates have been given of Pliny's " Historia Naturalis." Its intrinsic scientific value is very slight, as it is merely an uncritical compilation from the works of previous writers, dealing with all branches of knowledge and superstition. Historically, on the other hand, it is of high importance—at any rate so far as botany is concerned—since it represents the state of knowledge and the

views current in the first century of the Christian era. According to Singer's " From Magic to Science " (1928), p. 12, it contains extracts from about 2,000 works—most of them now lost—by about 146 Roman and 326 Greek authors.

The early herbals of the sixteenth century, such as those of Brunfels and Fuchs, were based primarily on Dioscorides, but drew largely also on Pliny, from whom much of their terminology was taken. His " Historia Naturalis " is consequently the source of many of our modern botanical terms. Some of these, however, were employed by Pliny in such different senses that acquaintance with modern terminology is a positive hindrance rather than a help in understanding their meaning, owing to the paralysing influence of the preconceived idea.

The history of botanical terminology has yet to be written, though many individual terms have been traced to their sources. As a beginning, a glossary of the botanical terms used by Pliny is now given, and it is hoped to follow this with similar accounts of the terminology employed by Isidorus (A.D. 560–636), Albertus Magnus (1206–80), and that used in the sixteenth-century Latin translations of Dioscorides.

The following are modern botanical terms employed by Pliny only in non-botanical senses : bractea, lamina, ligula, lomentum, ocrea, pistillum, pollen, ramenta, stigma, stilus, strophiolum, vernatio. These are included in the list for the sake of convenience. Among those used by him with different or additional botanical meanings are : adnatus, bacca, calyx, capitulum, cortex, cyma, folliculus, germinatio, racemus, siliqua, stipula, thyrsus ; satus meant not only " sowing," but also " seeding " and " planting," and serere had a corresponding range of meaning ; frutex and fruticosus are included below because they did not necessarily indicate woody plants, but sometimes herbs with a bushy mode of branching, as in the case of *Chelidonium majus* ; serratus is included because it covered " crenate " as well as " serrate," and saepes because it meant " fence " as well as " hedge." Ala was used by Pliny in the now obsolete senses of axil and axillary shoot, and apices for the anthers of *Rosa* ; while internodium, herbaceus (green), samara (fruit of *Ulmus*), stamen, and unguis (claw of a petal) were employed by him for the first time in their modern significations, except that samara and unguis occur also in Columella.

Pliny had little or no idea of comparative morphology : to him, radix was a root or any underground stem (rhizome, tuber, or bulb) ; bulbus was a bulb, corm or tuber ; and semen a seed or seed-like fruit. He used pediculus with the general signification of little stalk, whether short-shoot, petiole, petiolule, peduncle or pedicel. Caput and folliculus are examples of other words employed by him in very varied senses.

It is hoped that the glossary may also be helpful to those who have occasion to consult Pliny's " Historia Naturalis " in the

original Latin, since the existing English translations are not very satisfactory. Each meaning of a word is followed by a reference to a passage in which it is so applied, the volume, page and line of the Latin edition by Harduinus (1723) being cited. That edition contains copious and valuable explanatory notes. Where the meaning of a particular passage or word in Pliny seemed doubtful, the corresponding passages, if any, in Dioscorides (ed. Sprengel) and Theophrastus (ed. Hort) were consulted, and the passage in Pliny was then reviewed in the light of the identifications supplied by Sprengel and Hort. Lewis and Short's Latin dictionary is most helpful, but not entirely trustworthy. In Pliny at all events, calyculus does *not* mean " a small flower-bud, the cup or calyx of a flower " : it is used in the " Historia Naturalis " for the siliqua of *Glaucium* and the capsule of *Hypericum*. Similarly, whatever tŭber was, it was certainly not a kind of apple tree : it may have been the nectarine.

Considerable care has been taken to check the meanings and identifications given below, but it would be too much to hope that no mistakes have crept into the list, and the writer will accordingly be grateful for notes of any corrections that may be required in it.

Glossary.

acinus, (1) berry or other fleshy fruit, usually with soft flesh, e.g. of *Vitis*, *Sambucus*, *Hedera*, i. 750, ll. 23, 25 ; (2) berry-like seeds of *Punica*, i. 696, l. 22 ; 750, l. 25 ; ii. 425, l. 16.

aculeus, (1) spine, e.g. of *Rhamnus*, ii. 346, l. 17 ; (2) prickle, e.g. on leaves of thistles, ii. 249, l. 27 ; 250, l. 8.

adnatus, growing on, e.g. branches on a main stem, ii. 433, l. 13.

ala, wing, armpit, hence (1) leaf axil, ii. 429, l. 29 ; 434, l. 20 ; (2) axillary shoot, ii. 420, l. 20 ; 433, l. 9.

alabaster, lit. pointed perfume box, hence applied to the pointed flower-bud of *Rosa*, ii. 235, l. 23.

alburnum, outer part of sapwood, ii. 31, l. 20.

apex, lit. summit, top, applied to anther of *Rosa*, ii. 235, l. 24 : " in calycis medio sui stantis complexa luteos apices."

arista, awn of grasses, ii. 106, l. 21 ; 432, l. 10.

bacca, (1) berry or drupe, usually with firm flesh, e.g. of *Myrtus*, *Hedera*, *Cerasus*, *Prunus*, *Olea*, i. 667, l. 4 ; 733, l. 6 ; 752, l. 10 ; ii. 316, l. 33 ; 339, l. 6 ; (2) round fleshy cone of *Juniperus*, ii. 335, l. 18 ; (3) round cone (first fleshy then woody) of *Cupressus*, ii. 20, l. 29 ; (4) involucrate infructescence of *Fagus*, ii. 4, l. 7.

balanus, (1) acorn, nut of *Quercus* (esculus) ii. 72, l. 2 ; 4, l. 23 ; (2) *sardiani balani*, Sardian chestnuts (*Castanea*), i. 749, l. 22 ; (3) = *myrobalanus*, seed of *Moringa* (ben), ii. 273, l. 15 ; cf. i. 670, l. 25 : " premunt medici nucleos, tundentes affusa eis paulatim calida aqua " ; (4) the tree which bears myrobalani (*Moringa*), i. 688, l. 13 ; (5) date, fruit of *Phoenix dactylifera*, i. 686, l. 4 ; (6) suppository (from its shape), ii. 194, l. 16 ; 398, l. 32 : " haemorrhoidas pellere, subditas pro balanis," " balanis subditis."

bractea, thin plate or layer of metal or wood, ii. 616, l. 2 ; 39, l. 28.

bulbus, (1) bulbous plant, ii. 61, l. 18 ; (2) bulb, e.g. of *Lilium*, ii. 480, l. 28 ; (3) corm, e.g. of *Crocus*, ii. 238, l. 13 ; (4) tuber, e.g. of orchids, ii. 428, l. 24.

caducus, (1) deciduous, ii. 67, l. 18 ; (2) inclined to fall, ii. 86, l. 5 ; (3) perishable, i. 691, l. 24.

calamus, (1) cane, reed, ii. 27, ll. 11, 20 ; 28, ll. 6, 9, 11 ; (2) culm of cereals, straw, ii. 106, l. 21 ; 107, l. 30 ; (3) peduncle of *Nelumbo nucifera*, ii. 115, l. 20 ; (4) graft, scion, ii. 64, ll. 9, 22, 23 ; 68, l. 32.

calyculus, (1) siliqua of *Glaucium flavum*, ii. 218, l. 27 ; (2) capsule of *Hypericum*, ii. 424, l. 16.

calyx, cup, covering, rind : (1) involucre of *Castanea sativa* and (cupule) of *Quercus*, i. 749, l. 17 ; ii. 4, ll. 11, 19 ; (2) involucre of *Tragopogon*, ii. 440, l. 9 ; (3) involucre of *Gossypium*, i. 658, l. 8 ; (4) cup-like perianth of *Lilium*, ii. 236, l. 37 ; (5) calyx, cup formed by sepals of *Rosa*, ii. 254, l. 8 ; (6) corolla, cup formed by petals of *Rosa*, ii. 235, l. 24 ; (7) corona of *Narcissus*, ii. 237, l. 9 ; (8) cup-like capsule of *Papaver*, ii. 217, l. 23 ; 260, l. 5 ; (9) pericarp of *Punica Granatum*, ii. 565, l. 32 ; (10) fleshy outer pericarp of *Juglans regia*, i. 748, l. 15 ; (11) covering of wax, etc. round fruits to preserve them, i. 743, l. 23 ; (12) outer covering of a charcoal-heap, ii. 5, l. 5.

capillaceus, capillary, hair-like, i. 672, l. 25 ; 700, l. 10.

capillamentum, (1) hair (coll.), ii. 8, l. 9 ; 238, l. 24 ; (2) slender rootlet, ii. 434, l. 21.

capillatus, (1) clothed with hair, ii. 40, l. 8 ; (2) capillary, hair-like, ii. 17, l. 7 ; 170, l. 13.

capillus, (1) hair (coll.), ii. 88, l. 24 ; 278, l. 24 ; (2) stamens of *Crocus* and *Rosa*, ii. 238, l. 21 ; 254, l. 8.

capitatus, having or forming a head or bulb, applied to : (1) plants bearing capitula, e.g. *Filago*, ii. 353, l. 20 ; (2) plants forming large bulbs, e.g. *Allium Cepa*, ii. 171, l. 14.

capitulum, lit. little head, applied to : (1) capitulum of Compositae, ii. 353, l. 20 ; 424, l. 10 ; 428, l. 7 ; (2) false capitulum of *Dipsacus*, ii. 429, l. 19 ; (3) subglobose verticillaster of *Marrubium*, ii. 365, l. 14 ; (4) flower of *Hypericum*, ii. 424, l. 15 ; (5) nutlet of *Echium*, ii. 376, l. 2.

capreolus, tendril of *Vitis vinifera*, ii. 82, l. 3.

caput, lit. head, applied to : (1) bulb of *Allium*, ii. 171, ll. 5, 34 ; (2) head-like inflorescence, e.g. of *Euphorbia* and Umbelliferae, ii. 401, l. 6 ; 438, l. 29 ; (3) capitulum of *Senecio vulgaris*, ii. 386, l. 10 ; (4) capsule of *Papaver*, ii. 218, l. 12 ; (5) flower (and especially the receptacle) of *Nelumbo nucifera*, ii. 115, l. 20 ; " simile caput papaveri colore roseo : in eo fabae non super tricenas ; " (6) hip (fleshy pseudocarp) of *Rosa*, ii. 254, l. 22.

carnosus, fleshy, applied to : (1) roots, ii. 170, l. 14 ; (2) bulb-scales, ii. 164, l. 21 ; (3) leaves, ii. 17, l. 8 ; (4) fruits, i. 750, l. 9 ; (5) the wood of the cherry, as contrasted with that of the olive, ii. 31, l. 23 ; (6) resin, i. 736, l. 1 ; ii. 332, l. 2.

caro, flesh, pulp, (1) flesh of fruits and seeds, i. 750, ll. 9, 10 ; 752, l. 10 ; ii. 312, l. 26 ; (2) inner part of sapwood, ii. 31, l. 22.

caudex, codex, trunk of tree, i. 687, l. 11 ; ii. 21, l. 20.

cauliculus, coliculus, (1) small stem, ii. 384, l. 21 ; 439, l. 24 ; (2) branchlet, ii. 316, l. 5 ; 322, l. 9 ; (3) lateral shoots of cabbage (sprouts), ii. 176, l. 16.

caulis, colis, (1) stem, e.g. of *Faba* and *Verbascum*, ii. 115, l. 11 ; 378, l. 25 ; (2) cabbage, *Brassica oleracea*, ii. 87, l. 19.

circinatus, rounded, applied to the leaves of *Pyrus communis*, ii. 17, l. 19 ; and the young leaves of *Populus alba* and *P. nigra*, ii. 16, l. 22.

cirrus, tufted branchlet of *Equisetum*, ii. 395, l. 27.

clavicula, tendril of *Vitis vinifera*, ii. 297, l. 7.

coma, lit. hair of the head, hence applied to : (1) foliage, i. 672, l. 21 ; ii. 15, l. 12 ; (2) crown-like inflorescence of *Hypericum* and reeds, ii. 422, l. 21 ; 27, l. 16.

comosus, leafy, with much foliage, ii. 4, l. 29 ; 401, l. 15.

corolla, little garland, ii. 233, l. 23.

corona, garland, wreath, i. 688, l. 24.

coronarius, used for garlands, ii. 259, l. 31.

cortex, (1) bark, ii. 286, l. 20 ; 22, l. 11 ; (2) pericarp of nut of *Castanea*, i. 749, l. 19 ; (3) fleshy torus of *Rosa*, ii. 235, l. 23 ; 254, l. 8.

corymbus, rounded inflorescence or infructescence, e.g. : (1) umbel of *Hedera*, ii. 25, l. 26 ; umbel of *Pastinaca sativa*, ii. 278, l. 7 ; (2) verticillaster of Labiatae, ii. 413, l. 28.

crocus, yellow anther of *Lilium*, ii. 236, l. 36 ; 237, l. 2.

cubitalis, a cubit long, ii. 240, l. 7.

cubitum, ell, cubit, i.e. 17½ in., ii. 383, l. 12.

culmus, stem, especially of cereals, culm, straw, ii. 105, l. 8 ; 141, l. 12.

cuspis, (1) point, pointed end, spear, ii. 123, l. 21 ; 262, l. 16 ; 380, l. 34 ; (2) bee-sting, ii. 246, l. 31.

cyma, tender sprout of cabbage, ii. 176, l. 13.

deciduus, falling off, deciduous, e.g. of leaves, ii. 131, l. 12 ; of the flower of *Papaver*, ii. 181, l. 8 ; of mericarps of Umbelliferae, ii. 160, l. 19.

dehiscere, to burst open, split open, applied to a rosebud, ii. 235, l. 24, and to " siliquae " (i.e. pods), i. 658, ll. 13, 14.

divisus, divided, lobed, applied to the palmatifid leaves of *Platanus orientalis*, ii. 17, l. 10, the pinnatifid leaves of *Capsella Bursa-pastoris*, ii. 439, l. 24, and the bipinnatifid leaves of *Papaver Argemone*, ii. 375, l. 28.

dodrans, a measure of 9 inches, i. 373, l. 22 ; ii. 736, l. 15.

dodrantalis, nine inches long, ii. 292, l. 5.

echinatus, like a hedgehog (*echinus*), prickly, e.g. the involucre of *Castanea*, i. 749, l. 17 ; and the false capitulum of *Dipsacus*, ii. 429, l. 20.

enodis, without knots, applied to timber, i. 657, l. 13 ; ii. 12, l. 14.

exalbidus, whitish, i. 667, l. 15 ; ii. 353, l. 14.

excurrere, to sprout, shoot forth, ii. 82, l. 25.

fasciculus, bundle, bunch, ii. 156, l. 16 ; 179, l. 14 ; 304, l. 23.

filum, lit. thread, applied to the style of *Lilium*, ii. 236, l. 36.

fimbriatus, fringed, ciliate, clothed with fibrous rootlets, ii. 249, l. 17 ; 366, l. 8 ; 381, l. 4.

fistula, (1) pipe, tube, hollow reed, i. 671, l. 9 ; (2) ulcer, fistula, ii. 410, l. 12.

folium, (1) foliage leaf, ii. 15, l. 21 ; 17, l. 8 ; (2) leaflet of a pinnate leaf, i. 687, l. 5 ; (3) petal of *Rosa*, ii. 254, ll. 6–8.

folliculus (dim. of *follis*), lit. a small bag or sack, applied to : (1) the bladder-like accrescent calyx of *Physalis Alkekengi*, ii. 262, l. 9; (2) the pericarp of *Piper*, ii. 425, l. 7 ; (3) the husk of cereal grains, ii. 106, l. 24 ; (4) the legume of Leguminosae, e.g. *Acacia*, *Cytisus scoparius*, ii. 337, l. 12 ; 343, l. 23 ; (5) the siliqua of Cruciferae, ii. 173, l. 19 ; (6) the follicle of *Delphinium Staphisagria*, ii. 298, l. 31 ; (7) the capsule of *Euphorbia Lathyris*, ii. 433, l. 6.

frutex, shrub, bush (not necessarily woody), i. 683, l. 7 ; ii. 28, l. 23 ; 127, l. 25.

fruticosus, (1) full of bushes (or bushy trees), i. 323, l. 18 ; (2) much-branched, bushy, ii. 373, l. 19 ; 384, l. 9 ; 385, l. 8 : " fruticosum e radice."

fungosus, spongy, e.g. the pith of *Sambucus*, i. 698, l. 10.

gemma, leaf-bud, ii. 63, ll. 28, 29 ; 68, l. 13 ; 71, l. 8 ; 72, l. 17.

geniculum, lit. a little knee, hence a swollen node of a stem, e.g. of reeds, ii. 340, l. 17 ; of wheat and other cereals, ii. 105, l. 24 ; of *Polygonum*, ii. 436, ll. 3, 5 ; of *Dipsacus*, ii. 429, l. 18.

genus, kind, genus, species, ii. 25, l. 20 ; 241, l. 2 ; 400, l. 7.

germen, leaf-bud, sprout, ii. 18, l. 22 ; 64, l. 17.

germinare, (1) to sprout, shoot, come into leaf, ii. 16, l. 12 ; 18, l. 7 ; (2) to expand, of flower-buds, e.g. *Rosa*, ii. 235, l. 22 ; 236, l. 30.

germinatio, coming into leaf, ii. 18, l. 15.

glans, (1) acorn, nut of *Quercus*, ii. 4, l. 10 : " glanden quae proprie intelligitur, ferunt robur, quercus, esculus, cerrus, ilex suber " ; (2) nut of *Fagus*, ii. 4, l. 5 ; (3) nut-like seed of *Moringa*, i. 670, l. 16.

glaucus, bluish grey, lilac, applied to the flowers of *Verbena officinalis*, ii. 376, l. 10.

granum, (1) grain of cereals, e.g. *Hordeum*, ii. 105, l. 5 ; 106, l. 18 ; (2) pulse, seed of *Phaseolus*, *Lens*, *Cicer*, ii. 116, l. 14 ; 289, l. 15 ; 290, l. 15 ; (3) achene of *Ficus*, ii. 328, l. 24 ; (4) peppercorn, fruit of *Piper*, ii. 320, l. 8 ; (5) cochineal coccus, ii. 6, l. 18.

herbaceus, herbaceous, i.e. green, ii. 399, l. 5 ; 437, l. 12.

herbarius, (1) adj., relating to herbs, e.g. herbaria ars, i. 414, l. 4 ; (2) subst., herbalist, ii. 257, l. 12 ; 387, l. 4 ; 436, l. 19.

herbidus, (1) grassy, covered with herbs, ii. 122, ll. 20, 21 ; (2) obtained from herbs, ii. 331, l. 4 ; (3) herbaceous, i.e. green, i. 663, l. 26.

herbosus, full of herbs, grassy, ii. 122, l. 19.

hirsutus, hirsute, shaggy, villous, hispid, prickly: applied to roots of *Ficus*, ii. 22, l. 22; stem of *Agrimonia Eupatoria*, ii. 368, l. 26; leaves of *Raphanus Raphanistrum*, ii. 202, l. 7; stem and leaves of *Galium Aparine*, ii. 353, l. 32.

hirtus, hairy, shaggy, in Pliny applied only to men, animals and comets, not to plants, i. 88, l. 8; 329, l. 11; 373, ll. 11, 16.

hispidus, rough, shaggy, bristly, i. 499, l. 15; ii. 4, l. 11; 268, l. 30; 384, l. 4.

horridus, (1) bristling, bristly, i. 665, l. 12; ii. 167, l. 9; 429, l. 18; hence (2) harsh, raw, ii. 207, l. 16.

humor, lit. liquid, moisture, applied to sap, latex or resin of trees, ii. 31, l. 14.

imbricatus, shaped like a gutter-tile, i. 754, l. 26; ii. 243, l. 9.

incisura, (1) lit. cut, incision, i. 687, l. 22; (2) incision of a leaf, ii. 251, l. 5; 397, l. 17; (3) of a serrate margin of a leaf, i. 697, l. 15.

incisus, (1) lit. cut into, cut open, ii. 378, l. 13; (2) incised, e.g. the pinnatisect leaves of *Agrimonia Eupatoria*, ii. 368, l. 27.

insitum, graft, scion, ii. 67, l. 15.

internodium, space between two successive joints, internode, i. 372, l. 22; ii. 28, ll. 10, 18; 105, l. 29; 299, l. 19; 354, l. 15.

iulus, male catkin of *Corylus*, ii. 21, l. 17.

juba, lit. mane, crest, hence applied (like *coma*) to the crown of branchlets and foliage of trees, i. 323, l. 19.

lacinia, flap, applied to the foliaceous bract on the cladode of *Ruscus Hypophyllum* or *R. Hypoglossum*, i. 755, l. 4.

laciniosus, full of folds, applied to the leaves of *Alisma Plantago-aquatica*, ii. 379, l. 15.

lamina, (1) thin plate or leaf of metal, ii. 233, l. 24; (2) veneer of wood, ii. 38, l. 29; 39, l. 12.

lappa, (1) bur, also the burdock and other bur-plants, ii. 251, l. 21; 353, l. 33; 401, l. 1; (2) bur-nutlets of Boraginaceae, ii. 372, l. 3; 376, l. 3.

liber, inner smooth bark of trees, i. 654, l. 6; 689, l. 16.

lignum, (1) wood, ii. 12, l. 29; 13, l. 10; (2) woody shell (pericarp) of nuts, i. 752, l. 12; (3) stone (endocarp) of drupes, e.g. of *Olea*, *Cerasus*, *Amygdalus*, *Prunus*, i. 752, ll. 9, 12; (4) stone (hard endosperm) of date, i. 684, ll. 22, 30.

ligula, spoonful, ii. 193, l. 16; 331, l. 20.

loculosus, full of little compartments, plurilocular, i. 748, l. 23.

lomentum, bean-meal, ii. 114, l. 25; 748, l. 6.

malleolus (dim. of *malleus*, hammer, mallet), hammer-headed slip or cutting, mallet-shoot, ii. 72, l. 29; 74, l. 1; 75, ll. 11, 13.

mammosus, protuberant, i. 741, l. 18.

marcescere, (1) to wither, fade, ii. 233, l. 7; 245, l. 6; 260, l. 20; (2) to decay, ii. 37, l. 26.

materia, materies, wood, timber, ii. 12, l. 25; 35, l. 22; 48, l. 23.

medulla, (1) pith, e.g. of *Sambucus* and *Juncus*, i. 743, l. 24; ii. 253, l. 3; (2) heart-wood, ii. 11, l. 17.

mollis, soft, (1) in substance, tender, ii. 35, l. 28 ; 268, l. 29 ; 316, l. 8 ; 338, l. 25 ; (2) to the touch, i. 747, l. 16 ; ii. 258, l. 31.

mucro, sharp point or edge, applied to end of leaf-segments of palms, i. 683, l. 16 ; to end of leaf of *Pinus*, ii. 8, l. 9 ; to leaves of " tripolium," ii. 396, l. 8.

mucronatus, pointed, applied to the leaves of *Pyrus Malus* and *Sedum reflexum*, ii. 17, l. 9 ; 385, l. 9.

nervosus, stringy, fibrous, full of fibres, ii. 242, l. 15 ; 437, l. 14.

nervus, nerve, fibre, ii. 16, l. 29 ; 169, l. 2 ; 346, ll. 3, 5.

nodosus, containing or full of knots, ii. 12, l. 26 ; 34, l. 4.

nodus, lit. a knot, (1) a knot in timber, i. 686, l. 21 ; ii. 32, l. 4 ; (2) a node of the stem, e.g. of a reed, ii. 27, l. 15 ; 71, l. 8 ; of *Vitis vinifera*, ii. 72, l. 11.

nucamentum, fir-cone, ii. 9, l. 25.

nucleus, (1) kernel, e.g. of *Amygdalus*, *Cerasus*, *Juglans*, *Corylus*, i. 739, l. 22 ; ii. 309, l. 25 ; 318, l. 10 ; 773, l. 7 ; of *Pinus*, i. 738, l. 14 ; (2) hard seed of a berry or pome, e.g. of *Vitis*, *Malus*, *Pyrus*, ii. 57, l. 5 ; 298, l. 11 ; 566, l. 3 ; (3) hard part of seeds of *Punica*, ii. 312, l. 24.

nux, (1) nut, e.g. of *Corylus*, *Castanea*, *Juglans*, *Pistacia*, i. 749, ll. 1, 16 ; ii. 319, l. 13 ; 320, ll. 6, 11 ; (2) nut-tree, i. 686, l. 14 ; ii. 21, l. 22 ; (3) pine cone, ii. 318, l.15.

oblongus, rather long, oblong, i. 742, l. 5 ; ii. 173, l. 17 ; 361, l. 29.

ocrea, greave, legging, i. 415, l. 12.

oleraceus, resembling a potherb, ii. 403, l. 24.

olus, vegetable, potherb, ii. 87, l. 19.

ossa (pl. of *os*), lit. bones, applied to heartwood of trees, ii. 31, l. 22.

palmes, (1) young shoot of *Vitis*, ii. 74, l. 3 ; 76, ll. 6, 30 ; (2) spadix of *Phoenix dactylifera*, i. 683, ll. 15, 21, 23.

pampinosus, tendril-bearing, cirrhiferous, ii. 299, l. 19.

pampinus, (1) young tendril-bearing shoot of *Vitis vinifera*, ii. 79, l. 13 ; 82, l. 26 ; (2) tendril, e.g. of *Smilax aspera*, ii. 26, l. 30 ; 432, l. 29 ; 433, l. 1.

panicula, (1) panicle, e.g. of a reed, ii. 156, l. 11 ; (2) tuft of petals of a double rose, ii. 236, l. 13.

pappon, *pappum*, (1) hairs on pedicels of *Rhus Cotinus*, i. 698, l. 5 ; (2) plumose achene (cypsela) of *Cynara Cardunculus*, ii. 250, l. 16 ; (3) a name for groundsel, *Senecio vulgaris*, ii. 386, l. 11.

pediculus, little stalk, (1) petiole, ii. 17, l. 12 ; (2) petiolule, i. 687, l. 6 ; (3) short-shoot, spur of *Pyrus* and *Malus*, ii. 17, l. 17 ; (4) peduncle, e.g. of *Ficus*, *Pyrus*, *Quercus*, and *Cucumis*, i. 745, ll. 3, 4 ; 752, l. 26 ; ii. 4, l. 26 ; 165, l. 24 ; (5) pedicel, e.g. of *Hedera* and *Sambucus*, i. 752, l. 26 ; (6) stipes of an Agaric, ii. 280, l. 26.

pinnatus, feather-like, hence applied to : (1) the distichous foliage of *Abies*, ii. 9, l. 24 ; (2) the pinnately arranged leaflets of *Fraxinus*, ii. 12, l. 11 ; (3) the pinnately divided leaf of Ferns, ii. 430, l. 19.

pistillum, pestle, ii. 626, l. 6.

pollen, flour, fine powder, ii. 169, l. 8 ; 332, l. 30.

pomum, edible fruit, e.g. of *Malus*, *Pyrus*, *Cerasus*, *Punica*, *Phoenix dactylifera*, *Ficus*, i. 683, l. 14 ; 684, l. 22 ; 687, l. 10 ; 750, l. 30 ; ii. 21, l. 6 ; 313, l. 12 ; 314, l. 9 ; 327, l. 12.

propago, turion, layer (hortic.), ii. 63, ll. 5, 10.

putamen, (1) shell (pericarp) of a nut, i. 752, l. 13 : "putamine clauduntur nuces" ; (2) shell (endocarp) of walnut, *Juglans*, ii. 319, l. 21 ; 537, l. 11 ; (3) stone (endocarp) of almond, *Amygalus*, i. 688, l. 9 ; (4) shell of a pod, e.g. of *Faba*, ii. 87, l. 20 ; (4) rind (pericarp) of *Punica*, ii. 289, l. 10.

quincuncialis, (1) 5 inches long, i. 531, l. 6 ; ii. 433, l. 17 ; (2) planted in the form of a quincunx, ii. 60, l. 6.

racematus, clustered, bearing clusters, ii. 105, l. 16.

racemus, (1) peduncle, i. 752, l. 26 ; ii. 20, l. 15 ; (2) bunch of berries (thyrse) of *Vitis*, i. 712, l. 10 ; and (umbel) of *Hedera*, ii. 25, l. 25.

radix, root, underground stem : (1) root, ii. 22, l. 16 ; (2) rhizome, ii. 28, l. 4 ; (3) tuber, ii. 384, l. 22 ; (4) bulb, ii. 260, l. 27.

ramenta (pl.), scrapings, shavings, chips, ii. 190, l. 3 ; 316, l. 17 ; 327, l. 1.

ramulus, lit. branchlet : (1) branchlet, e.g. of *Filago*, ii. 353, l. 20 ; 370, l. 9 ; 376, l. 8 ; (2) stem, ii. 347, l. 24 ; (3) rhachis of pinnate leaf of *Astragalus Poterium*, ii. 437, l. 11 ; (4) rhachis of a Fern leaf, ii. 275, l. 28.

ramus, lit. branch : (1) main branch, bough of a tree, e.g. of *Ficus*, i. 687, l. 20 ; (2) branch of a herb, e.g. of *Ruta*, ii. 179, l. 11 ; (3) rhachis of a pinnate leaf, e.g. of *Rhus*, i. 687, l. 6.

regerminare, to shoot forth again, ii. 25, l. 1 ; 174, l. 3.

regerminatio, shooting forth again, ii. 71, l. 11 ; 174, l. 5.

rosaceus, made of, or from roses, i. 737, l. 18 ; ii. 234, l. 10.

saepes, (1) hedge, i. 657, l. 19 ; (2) fence, i. 441, l. 3.

samara, fruit of *Ulmus*, ii. 14, l. 9 ; 59, l. 19.

sarmentum, slender branch or branchlet, ii. 56, l. 6 ; 290, l. 21 ; 299, l. 19.

satus, sowing, seeding, planting : (1) sowing, ii. 104, l. 20 ; 167, l. 11 ; (2) seeding, i. 746, l. 9 ; (3) planting, e.g. of cuttings, ii. 67, l. 34.

scapus, (1) stem, i. 698, l. 12 ; ii. 365, l. 13 ; (2) peduncle, ii. 115, l. 19 ; 181, l. 5 ; 217, l. 24.

scopa, (1) slender branch, e.g. of *Marrubium* and *Origanum*, ii. 224, l. 22 ; 272, l. 23 ; (2) broom made of the branches of *Ruscus aculeatus*, ii. 322, l. 23.

semen, seed or seed-like fruit, ii. 183, l. 5 ; 14, l. 10.

sepes, vide *saepes*.

serere, to sow, plant, (1) to sow seeds or fruits, ii. 57, ll. 27, 28 ; 128, l. 3 ; (2) to plant cuttings, ii. 58, l. 18 ; 67, l. 33 ; 179, l. 9.

serratus, serrate, crenate, ii. 347, l. 15 ; 372, l. 20.

sessilis, (1) sitting or inserted on : "pira . . . minimo pediculo sessilia," i. 742, l. 4 ; (2) without a stem, i.e. low, dwarf, ii. 174, l. 20.

siliqua, (1) pod (legume) of Leguminosae, e.g. *Ceratonia Siliqua, Faba, Cicer, Pisum, Vigna*, i. 722, l. 31 ; 750, l. 5 ; ii. 105, l. 10 ; 115, l. 11 ; 116, l. 13 ; (2) the Carob tree, *Ceratonia Siliqua*, ii. 550, l. 22 ; (3) capsule of *Euonymus europaeus, Fagonia cretica, Hypericum, Rhinanthus*, i. 697, l. 20 ; ii. 250, l. 22 ; 403, l. 24 ; 424, l. 29 ; (4) follicle of *Paeonia*, ii. 431, l. 17.

silvestris, lit. belonging to or living in a wood, hence growing wild, i. 739, l. 3 ; ii. 167, l. 9.

soboles, suboles, basal shoot, sucker, ii. 58, l. 3.

spatha, (1) spatula, ii. 662, l. 4 ; (2) spathe of a palm infructescence, ii. 20, l. 15.

spathe, a tree also known as *elate*, i. 675, l. 26 ; ii. 311, l. 14.

species, particular kind, species, ii. 25, l. 22 ; 241, l. 2.

spica, (1) ear of corn, spike, ii. 20, l. 14 ; 109, l. 9 ; (2) spicate inflorescence, e.g. of *Celosia*, ii. 241, l. 9.

spina, (1) thornbush, thorntree, ii. 57, l. 19 ; 343, ll. 13, 16, 17, 21 ; (2) prickle, e.g. of *Rubus, Carduus* and *Dipsacus*, ii. 31, l. 11 ; 428, l. 6 ; 429, l. 18 ; (3) spine-like leaf, e.g. of *Juniperus*, ii. 17, l. 8.

spithama, span, i.e. 9 in., i. 373, l. 22.

stamen, lit. thread, applied to : (1) fibre of wood, ii. 32, l. 10 ; (2) stamen of *Lilium*, ii. 236, l. 37.

stigma, scar, ii. 387, l. 2.

stilus, pointed instrument, ii. 126, l. 3 ; 666, l. 15.

stipes, trunk, ii. 89, l. 15.

stipula (dim. of *stipes*), (1) culm of a grass, ii. 114, l. 15 ; 292, l. 20 ; (2) straw, ii. 140, l. 37.

stirps, (1) root-stock, ii. 28, l. 3 ; (2) lower part of plant, ii. 165, l. 26 ; (3) main stem, trunk, ii. 87, l. 9 ; (4) stem, i. 453, l. 25.

stolo, sucker, water-shoot, ii. 48, l. 9 ; 71, l. 23.

strophiolum, a small wreath, ii. 233, l. 11.

succosus, full of juice, i.e. fleshy, applied to the leaves of *Sedum reflexum*, ii. 385, l. 9 ; full of latex, e.g. the stem of *Euphorbia Characias*, ii. 400, l. 9.

surculosus, shrubby, woody, twiggy, many-stemmed, ii. 105, l. 30 ; 243, l. 14 ; 413, l. 27.

surculus, (1) branchlet, twig, ii. 275, l. 12 ; 322, l. 11 ; 512, l. 12 ; (2) scion, graft, ii. 64, l. 10.

talea, cutting, ii. 57, l. 16 ; 67, l. 34.

tegmen, covering, cover, hence applied to the pericarp of *Punica Granatum*, ii. 282, l. 13 ; 289, l. 13.

thyrsus, spear-like stem, e.g. of *Lactuca* and *Asparagus*, ii. 175, l. 15 ; 177, l. 27.

trientalis, four inches long, ii. 423, l. 31.

truncus, trunk of tree, bole, ii. 65, l. 13.

tūber, n. (plur. tūbera), lit. a swelling, hence : (1) burr on tree-trunk, e.g. of *Acer* and *Alnus*, ii. 13, ll. 14, 17 ; (2) truffle, ii. 159, ll. 12, 29 ; (3) tuber, e.g. of *Aristolochia*, ii. 374, l. 19. (4) " tuber terrae "=*Cyclamen*, ii. 377, l. 27.

tŭber, m. and f. (plur. tŭberes), (1) an African-fruit-tree, possibly the nectarine, ii. 18, l. 36 ; (2) its fruit, i. 740, ll. 14, 18.

tunica, skin, covering, coat, hence : (1) veil of Agarics, ii. 280, ll. 24, 25 ; (2) bark, e.g. of *Cinnamomum*, i. 669, l. 28 ; (3) inner bark or bast, e.g. of *Tilia* and *Quercus*, ii. 12, l. 29 ; 327, l. 6 ; (4) layer of bark, ii. 2, l. 14 ; (5) leaf-sheath (vagina) of reeds, ii. 28, l. 21 ; (6) bulb-scale, e.g. of *Allium*, ii. 164, l. 21 ; 171, l. 33 ; (7) husk of cereal grains, ii. 106, l. 20 ; 107, l. 30 ; (8) seed-coat (testa), e.g. of *Pinus* and *Faba*, i. 738, l. 15 ; ii. 142, l. 10.

unguis, claw of petal in *Rosa*, ii. 254, ll. 7, 9.

utriculus (dim. of *uterus*), husk of grain, ii. 114, l. 16.

uva, (1) a grape, i. 752, l. 15 ; (2) a cluster of grapes, i. 707, l. 6 ; (3) the grape-vine, i. 596, l. 27 ; ii. 219, l. 17 ; (4) clusters of grape-like berries, e.g. of *Laurus*, ii. 21, l. 15.

vasculum, (1) a small vesssel, e.g. *vasculum fictile*, earthenware pot, ii. 384, l. 26 ; (2) capsule of *Sesamum* and *Papaver*, ii. 105, l. 11 ; (3) fruit of *Punica Granatum*, i. 752, l. 27.

vepres, thorn-bush, i. 697, l. 9 ; ii. 579, l. 18.

vernatio, the slough cast off by a snake, ii. 510, l. 12.

vimen, pliant twig, switch, withy, ii. 30, l. 8.

virga, slender straight branch, rod, wand, switch, e.g. of *Myrtus* and *Populus*, i. 738, l. 8 ; ii. 334, l. 12.

vitis, (1) the grape-vine, *Vitis vinifera*, i. 706, ll. 6, 8, 15 ; (2) vine in general, climbing plant, e.g. "vitis alba" (*Bryonia dioica*), "vitis nigra" (*Bryonia alba*), ii. 299, l. 17 ; 300, l. 10.

VII.—SILENE SUBCONICA AND S. JUVENALIS.

W. B. Turrill.

Silene subconica Friv. was published in Flora, xviii. 334 (1835) with the following brief description. "Calycibus fructus subconicis striatis profunde dentatis, foliis hirsutis lanceolatis, petalis crenatis. Hab. in Rumelia." This description is insufficient to diagnose a species of *Silene* but, fortunately, Grisebach, Spic. flor. rumel. et bithyn. i. 171 (1843), under the name *S. cylindriflora* Otth. (ex diagn.) provides a longer description based on Frivaldszky's specimens which he states were collected "in arenosis maritimis pr. Makri ad litus Aegaeum" and "in montanis circa Philippopolim." Frivaldszky's specimens at Kew are taken as type material.

In the Index Semin. Hort. Monsp. 1836, 28 (1837), Delile described a plant from fields at Port Juvenal under the name *Silene juvenalis*. A copy of Delile's description in Gay's handwriting is preserved at Kew on a sheet sent by Delile to Gay in 1836. This sheet is taken as type material of *S. juvenalis*.

There has been difference of opinion as to whether *S. subconica* and *S. juvenalis* are or are not conspecific. Boissier (Flor. Or. i. 579 : 1867) keeps them distinct and says of the former "differt a *S. Juvenali* calyce angustiora et longiori (7–8 lin. longo lineam $1\frac{1}{4}$ lato), unguibus exsertis, capsulâ stipite longiori (4 lin. longo) suffultâ."

Rohrbach, Monogr. Silene, 90 (1868), also retains both species. Velenovský, Flor. Bulg. 58 (1891), uses the name *S. subconica* for the Bulgarian material but in his Supplementum, i. 36 (1898), he changes the name to *S. juvenalis*. Halácsy, Conspect. Flor. Graec. 1. 161 (1900), has *S. juvenalis* as the name for Thessalian and Greek specimens and also keeps *S. Tempskyana* Freyn et Sint. as a distinct species. Ascherson and Graebner, Synops. v. Abt. 2, 86, give *S. subconica* as a species and *S. juvenalis* as a subspecies. Hayek, Prodr. flor. penins. balc. i. 259 (1924), reduces *S. juvenalis* to a variety of *S. subconia*. Hampe, in Flora, Jahrg. 20, i. 226 (1837), says " *Silene subconica* Friv. ist von unserer *S. conica* nicht verschieden."

The characters used by those authors who retain both *S. subconica* and *S. juvenalis* have been investigated one by one and it has become clear that they have no value for differentiating the plants into two species, or even into two varieties of one species. Most, if not all, of the characters have a range of variation which appears to be of a merely fluctuating nature. Such apparently fluctuating characters, often varying on the same specimen and usually in specimens of the same collection, include : the indumentum of the stem and leaves, the shape of the bracts and prophylls, the width of the calyx-teeth and the degree to which the white membranous margin is developed, the slight variations in the degree to which the petal claws are exserted (see, however, the var. *Grisebachii* mentioned below), and the length of the carpophore. The shape of the capsule is a very difficult character to evaluate but no differences as marked as those separating typical *Silene maritima* from typical *S. vulgaris* have been found. So far as ripe seeds are available, no more than slight variations have been found, again nothing so extreme as the contrasting armadillo and tubercled variations occurring in both *S. maritima* and *S. vulgaris*.

In its original French station *S. juvenalis* was certainly an introduced plant. Allowing for this the distribution of supposed *S. juvenalis* and *S. subconica* are within almost the same boundaries, the latter supposedly extending farther north in the Balkan Peninsula.

There being no constant morphological differences correlated with geographical or other isolation, *S. subconia* and *S. juvenalis* have been considered by the writer as one species. Further, with available existing herbarium material it is impossible to separate out any variety, except the var. *Grisebachii* and doubtfully the var. *Tempskyana*.

Davidoff, in Trud. na Blg. Prirod. Druž. viii. 53 (10 of separate) (1915), has described a var. *Grisebachii* of *Silene subconica*. His Latin description reads " Unguibus petalorum longe exsertis, carpophoro longiore (vix 2 mm.), seminibus tuberculatis a typo recedit.—In arenosis maritimis ad ostium rivi Maritza, ad urb. Dede Aghac, Macri et Port-Lagos." A translation of his Bulgarian note is : " It flowers 10–15 days later than the typical kind and is met with in little communities here and there along the sands of our

White Sea [Aegean] coast [i.e. of Western Thrace], which it beautifies by its tall growth and rose-coloured flowers." A specimen collected at Porto Lagos, in dry sandy places, 23.5.30 (*Tedd* 334) is at Kew and agrees with Davidoff's description in having the petal claws exserted (up to 7 mm.) beyond the tips of the calyx teeth. There are no ripe fruits on this specimen but probably the carpophore would be at least 3–4 mm. long. Possibly " mm." in Davidoff's description should be " lin." The long exserted petal claws suggest a character of a mutational nature well marked off from the slight fluctuations seen in a series of *S. subconica* (*S. juvenalis*) specimens from other areas. So far as is known the variety occurs only on the West Thracian coast of the Aegean and may have spread from one place of origin.

Freyn and Sintenis, in Bull. Herb. Boiss. v. 584 (1897), described, as a species, *Silene Tempskyana*, basing their description on material collected in Thessaly, in vineis ad Kalambaka, 4.5.1896 (*Sintenis* 23). A comparison of Sintenis's sheet of this number at Kew with the types and other material of *S. subconica* and *S. juvenalis* shows that the characters relied on by Freyn and Sintenis have no differential value. The specimens are only a robust variety (or even more probably a mere habitat modification) of *S. subconica*. In height they are not taller than Delile's material at Kew. The flowers, and especially the petals, are larger than these in Frivaldszky's specimens, but scarcely exceed those of other Macedonian and Bulgarian material. The calyx shape and stem-indumentum are as in *S. subconica*. The original description is somewhat loose in saying " filamentis . . . glabris supra basin tantum subpubescentibus "—they are markedly pubescent in the lower part as in all plants of this group—and inaccurate in describing the immature capsule as sessile ; the carpophore is 1·5 mm. long compared with a carpophore of 2 mm. length in Delile's specimen of *S. juvenalis*, measured from a fruit of corresponding age. At the end of their description and notes Freyn and Sintenis confess that " *S. Tempskyana* dürfte am besten als Unterart der *S. juvenalis* aufzufassen sein." The species is maintained distinct, chiefly on the inaccuracies of the original description, by Halácsy and Hayek.

Accepting *Silene subconica* Friv. in the sense indicated above (i.e. with *S. juvenalis* and *S. Tempskyana* as synonyms and including the var. *Grisebachii*) the following is the species distribution :

S.E. Italy ; Greece ; Thesaly ; N. Macedonia ; S. Macedonia ; Thrace ; N. Bulgaria ; S. Bulgaria ; Rodope Massif ; Dobruja ; Serbia ; Hercegovina ; Asia Minor east to Armenia. The species has also been recorded from S. France (Port Juvenal) and Germany (Hamburg and near Berlin).

There remains for consideration the relationship between *S. subconia* and *S. conica* L. Without doubt this is very close. Hampe reduced them to one species, while Otto Kuntze (in Acta Hort. Petrop. x. pt. 1, 174 : 1887) makes *subconica* a variety of *conica*.

Kuntze's remarks about the capsules and seeds are confirmed by an examination of the Kew material. There seems, however, sufficiently valid evidence to keep *S. conica* and *S. subconica* distinct. The flowering calyx shape (nearly or quite parallel-sided in *subconica*, widest below the middle in *conica*), the larger petal laminae and their pink colour in *subconica*, and the relatively longer " carpophore " in *conica* are the best morphological characters for differentiation. Further the geographical distribution of *S. subconica*, as here defined, is a natural and practically continuous one, apart from its alien occurrences. The descriptions of *S. conica* in standard floras are mostly incomplete, partially inaccurate, and often conflicting. The degree of glandulosity of the calyces and stems shows a considerable range especially in material from the Mediterranean countries. Very occasionally plants occur which it is difficult to place satisfactorily. Thus the specimens distributed in the Flor. Ital. Exsic. ser. 3, no. 2854, under the name *Silene conica* subsp. *subconica* Friv. (pro. sp.) var. *Montefortiana* Bég. et Ferr. are, from the material seen, doubtfully placed under *S. subconica*. The description reads " Differt a typo descripto a cl. Frivaldszky et Boissier praesertim petalis albis laminis $\frac{1}{3}$ brevioribus et unguibus longioribus emarginatis et aliquando bifidis. Forma cultura constans," and the locality is given as Lucania.—Abriola, in pascuis saxosis et in glareosis montis Serra di Monteforte, alt. 1300–1450 m., solo calcareo.—30 May, 1926. Another sheet, with two specimens from Herb. H. Groves, collected " inter segetes," S. Pietro della macchia prope Manduria 4/78, is more typically *S. subconica*. It is not possible to say from the original description alone what *Silene conica* β *glandulosa* of Caldesi in Nuovo Giorn. Bot. Ital. xi. 339 (1879) exactly represents. Ferrari, on the printed label to no. 2854 of the Flor. Ital. Exsic. ser. 3, says that *S. subconica* Friv. is intended. His identification is based mainly on the fact that " Gli esemplari trasmessi dal Caldesi ad alcuni Erbari da me esaminati a quelli conservati nel suo stesso Erbario posti a mia disposizione dalla Direzione dell'Ist. bot. di Bologna, collimano con i macedoni, bulgarici ecc. con cui l'ho confrontati." From the brief description given by Caldesi and from the locality of his material, " in campis arenosis inter sata *all'Isola* prope Faventiam, *in Sarna*," a doubt still remains.

Heldreich, in describing the supposed new species *Glaucium Serpieri* (in Regel, Gartenflora, xxii. 323 : 1873) from Laurion, eastern Greece, refers to the occurrence of *Silene juvenalis* " bei den Bleihütten von Ergastiria " in 1866, and adds " in diesem Jahre (1873) nun fand ich die Pflanze in grosser Masse, nicht nur bei Ergastiria, sondern auch bei Pascha-Limuni und auf den höher im Laurion-Gebirge gelegenen Localitäten Kamariza und Sinterini die alten Halden und Schlackenlager buchstäblich bedeckend und mit ihren schönen hochrothen Blüthen einen herrlichen Anblick gewährend." After describing the *Glaucium* Heldreich puts forward

the suggestion that the sudden appearance of *Glaucium Serpieri* (shown in a forthcoming paper in the K.B. by the present writer to be *G. flavum* var. *leiocarpum*) and of *Silene juvenalis* (=*S. subconica*) in the Laurion area was due to their seeds having remained dormant for 1500 to 2000 years in the soil under the heaps of old mining and smelting debris. When these heaps were removed for re-smelting the seeds were "erst jetzt wieder zu neuem Leben zu erwachen." In the Atti Congr. Internat. Bot. Firenze 1874, 137 (1876) the same suggestion is sustained in the words "il est très probable que ces plantes ont été cultivées jadis par les anciens, et que leurs graines sont ensuite restées enfouies pendant des siècles sous les scories." A detailed taxonomic investigation, an outline account of which is given above, has shown that *S. juvenalis* is conspecific with *S. subconia*, a not uncommon species in the countries around the Aegean Sea. There is nothing in the taxonomy or distribution of *S. subconica* to make it *a priori* improbable for it to occur naturally in the Laurion district. No evidence of its cultivation by the ancients has been found. Its natural habitat is in rather open communities and grasslands in early successional stages and, like some other species of the genus, it will quickly spread into loose terrain. Further, *Silene vulgaris* seeds certainly do not retain their vitality for a period of great length (probably 10 years is a normal maximum), and structurally there is nothing to suggest long retained vitality as a character of *S. subconica* seeds. Lastly, the details given by Heldreich are insufficient to prove his case. In all probability both the *Glaucium* and the *Silene* were in the neighbourhood before the heaps of débris were removed and simply spread rapidly on the vacated and denuded ground in the absence of close competition. The evidence is all against either *Glaucium* or *Silene* at Laurion being examples of long enduring seed dormancy.

VIII.—A NEW PYRETHRUM. A. R. Horwood.

In July 1932 a *Pyrethrum* was forwarded to Kew by Dr. F. Lemperg, of Hatzendorf, Austria, raised from seeds from Mr. Ingwersen and believed to be *P. densum*. Dr. Lemperg remarked that he did not consider the specimen to be this plant, but that it represented an undescribed species. This agreed with a view which had already been reached at Kew during a re-arrangement of the genus *Chrysanthemum* in the Herbarium. Amongst the material in the Herbarium named *P. Aucherianum* DC., cultivated specimens had been found which were identical with Dr. Lemperg's plant and these had been set aside to be described later as a new species.

Chrysanthemum (**Pyrethrum**) **praeteritum** *Horwood*, sp. nov.; affine *C.* (*Pyrethro*) *Aucheriano* DC., a quo differt habitu diffuso, caulibus ramosioribus, foliis haud bipinnatis et capitulis minoribus.

Suffrutex sempervirens, habitu elato, pluricaulis, caulibus pedalibus vel bipedalibus basi lignosis fusco-brunneis, ramulis juvenilibus lanatis pannosis biennibus, vetustis decorticatantibus cortice scisso demum denudatis, ramis multidivisis vel trichotomis. *Folia* alterna, pinnata, sericeo-pubescentia, usque ad 3–4 cm. longa, circiter 1 mm. lata, foliolis numerosis lineari-lanceolatis crenulatis ad 7 mm. longis 1 mm. latis, inferiora petiolis longioribus instructa. *Petioli* circiter 1·3 cm. longi. *Caules floriferi* monocephali, ramis elongatis tenuibus erectis ad 7·5–15 cm. longis, capitulis solitariis ad 2 cm. latis. *Receptaculum* nudum. *Involucrum* hirtulum, phyllis biserialibus exterioribus ovatis basi subcordatis carinatis margine membranaceis apice scariosis, intimis longioribus oblongis apice late fusco-scariosis. *Flosculi radii*, niveo-albi vel cremei, circiter sedecim, 5–6 mm. longi, iis disci subaequilongi. *Flosculi disci* tubulosi flavi, corolla ovario aequilonga. *Cypselae* corona breviter crenato-dentata instructae, paucicostatae, obsolete striatae, glabrae.

Hab. Patria ignota, verosimiliter Oriens. Cult. in Hort. Bot. Reg. Kew., June 1912 (type), June 1914, Oct. 1918; cult. Hatzendorf b. Fehring, Steiermark, Austria, July 1932, *F. Lemperg.*

This plant has been long known in botanic gardens under the names *Tanacetum Aucherianum* Schultz, *Pyrethrum Aucherianum* DC., *P. densiflorum* auct., and *P. densum* Labill. *P. praeteritum* differs from the last-named species in having the branches of the inflorescence with solitary capitula. In *P. densum* the inflorescence is much branched. The trivial *praeteritum* has been chosen because the plant has been so long overlooked as a distinct species.

The leaves when rubbed give off a rather strong aroma, not altogether unpleasant, and the plant would probably serve as a useful insecticide. With its close, neat habit, it is a suitable dwarf shrub for a Rock Garden. It flowers at Kew in June, and is perfectly hardy in well drained soil.

IX.—NOMENCLATURE OF SOME AUSTRALIAN AND PHILIPPINE ISLANDS PLANTS.

C. T. White (Brisbane).

The following notes were made in checking up the naming of some specimens from North Queensland recently.

ELAEOCARPACEAE.

Elaeocarpus Michaelii *C. T. White*, nom. nov.—*E. longipetiolatus* C. T. White in Dept. Agric. Brisbane Bot. Bull. xxi. 3 (1919), non Merrill.

QUEENSLAND.

MYRSINACEAE.

Tetrardisia bifaria (*White et Francis*) *C. T. White*, comb. nov.—*Ardisia bifaria* White et Francis in Proc. Roy. Soc. Queensland, xxxv. 8, 73 (1923). *Tetrardisia disticha* Domin in Biblioth. Bot. xxii. (Heft 89, vi.) 1058 (1928).

QUEENSLAND.

Cryptocarya Merrillii *C. T. White*, nom. nov.—*C. cinnamomifolia* Merrill in Philipp. Journ. Sci. Bot. xii. 128 (1917), non Benth.

PHILIPPINE ISLANDS.

Litsea reticulata (*Meissn.*) *F. Muell.* Census Austral. Pl. 4 (1882) ; F. M. Bailey, Syn. Queensland Fl. 427 (1883).—*Tetranthera reticulata* Meissn. in DC. Prodr. xv. sect. 1, 193 (1864).

QUEENSLAND and NEW SOUTH WALES.

F. Mueller is, so far as I can see, the authority for the above combination credited by Bailey (Queensland Flora, iv. 1312) to Bentham and Hooker, and by F. Mueller (l.c.), Maiden (Forest Flora N. S. Wales, v. 103) and Francis (Australian Rain-forest Trees, 110) to Bentham. The actual combination *Litsea reticulata* was not made in the Genera Plantarum.

X.—MISCELLANEOUS NOTES.

Podostemaceae or Podostemonaceae.—The family name was originally published in the form Podostemeae (Rich. ex H.B.K. Nov. Gen. i. 246 : 1816), and was modified to Podostemaceae by Lindley (Nat. Syst. ed. 2, 190 : 1836). The spelling Podostemoneae was introduced by Reichenbach (Consp. 97 : 1828), and the form Podostemonaceae was apparently used for the first time by Engler (Engl. & Prantl, Nat. Pflanzenfam., Nachtr. zu Teil II–IV. 179 : 1897). Under the International Rules of Nomenclature, the name of a family is formed from that of its type genus by the addition of the suffix -aceae to the stem of the generic name. The correct spelling (under International Rules) of the generic name concerned being *Podostemum*, the family name is therefore Podostemaceae.

The erroneous spellings Podostemoneae and Podostemonaceae were introduced by Reichenbach and Engler respectively, because they employed the Greek form of the generic name, *Podostemon* (which appeared on Michaux's plate), instead of the Latin form *Podostemum* (as published in the text). But the latter form was deliberately adopted by Michaux (Fl. Bor.-Am. ii. 164 : 1803), and must therefore be retained under International Rules. Inspection of the names of other new genera published in the same work shows that, though formed in most cases from Greek words, they were given a latinized ending, e.g. *Leptanthus*, *Tripterella*, *Caulophyllum*, except where the resulting Greek name already ended in *-a* or *-is*, e.g. *Dichromena*, *Oryzopsis*. There were three new generic names formed from two Greek words of which the second was στήμων (stamen), namely, *Brachystemum*, *Petalostemum*, and *Podostemum*. In each case the Latin termination *-um* was adopted. The names *Brachystemum* and *Petalostemum* appeared also on the accompanying plates. The occurrence of the spelling *Podostemon* on the plate of *Podostemum ceratophyllum* is therefore clearly due to an oversight. T. A. S.

Botanical Magazine.—Part iv. of vol. clv. was published on October 8th and contains the following plant portraits, three being of new species : *Iris Dykesii* Stapf (t. 9282), a new species allied to Dykes' *I. chrysographes* and known only from gardens ; *Berberis xanthoxylon* Hasskarl (t. 9283), a species native to Java and Sumatra resembling *B. Hookeri* ; *Syringa villosa* Vahl (t. 9284), a beautiful pink-flowered Lilac from a small area in the western mountains of Peking, China, which has been confused with *S. pubescens* and *S. emodi* ; *Salvia mexicana* Linn. (t. 9285), a native of Mexico ; *Coprosma propinqua* A. Cunningham (t. 9286), an interesting New Zealand shrub with white berries ; *Ourisia alpina* Poepp. et Endl. (t. 9287), from the Andes of Chile and Argentina ; *Tulipa urumiensis* Stapf (t. 9288), a new species allied to *T. australis* Link, a native of Azerbeidjan, Persia ; *Primula concholoba* Stapf et Sealy (t. 9289), a new species, belonging to the *muscarioides* series, discovered by Captain Kingdon Ward in the high mountains of the Assam-Burma-Tibet frontier ; *Rhododendron floccigerum* Franch. (t. 9290), discovered in 1895 by Pere Soulie in N. W. Yunnan ; *Vaccinium retusum* Hook. f. (t. 9291), a native of the Himalaya of Sikkim and Bhutan, and *Papaver triniifolium* Boiss. (t. 9292), with silver glaucous leaves, a native of Inner Eastern Asia Minor.

This Part, which completes vol. clv., is dedicated to Mr. Thomas Hay, M.V.O., V.M.H., Superintendent of the Royal Parks, London, whose portrait forms the frontispiece to the volume.

Sempervivums.*—We have received from the Royal Horticultural Society a copy of a volume by Dr. Lloyd Praeger entitled " Sempervivums." Probably few genera of cultivated plants are in such confusion as the genus *Sempervivum*, and horticulturists, not only in Britain, but throughout the world wherever these hardy succulents are cultivated, will welcome the appearance of this monograph. The author points out the causes which have led to confusion in the past, the chief of which he shows to be hybridization, frequent in the wild state, but wholesale in gardens where many species are grown in close proximity. No plant increases more easily by offsets, and yet seed is frequently saved and distributed with most unfortunate nomenclatural results.

Dr. Praeger spared no pains in collecting and studying the plants in their native haunts, and in order to do so he travelled extensively in Central Europe, including the Balkans, and in Madeira, the Canary Islands, etc. Having acquired his material, he grew it and continued its study for several years in the Dublin Botanic Gardens, either in the open or under glass. The result of his researches is a most valuable treatise which is essential to all horticulturists and botanists interested in the group.

---

* By R. Lloyd Praeger, D.Sc. (London). Published by the Royal Horticultural Society, 1932, pp. 265, 107 figures. Price to Fellows, 15s.; to non-Fellows, 21s.

Aster alpinus and allied species.*—This exhaustive monograph on the *Alpigeni* section of *Aster* describes all the known forms of that polymorphic group, their morphology, distribution and taxonomy receiving full treatment. The work is based on the examination of Herbarium specimens and it may, perhaps, be regretted that attention was not paid also to other aspects of the group, such as ecology, cytology and genetics. If, however, future work on these lines should be attempted, this monograph will form an excellent morphological and taxonomic basis. As in other numbers of this series, the work is beautifully produced, the plates and maps adding much to its value.

The Cactus and its Home.†—This little book should prove of great interest to Cactus-growers in this country. It is written by an acknowledged authority on the family and describes in some detail, and with many photographs, the structure, morphology, taxonomy, ecology and cultivation of the group. It provides, therefore, a background of knowledge which will be of great use to those engaged in the cultivation of American succulents. Of especial interest are the photographs of American Cactus collections, such as the Boyce Thompson Southwestern Arboretum at Superior, Arizona.

Corrigenda.—In K.B. 1932, no. 8, p. 356, line 4, for *C. crassum*, read *C. lactescens*. In the same number, p. 375, lines 20–21 (*Rammell* 1054) should be transferred from *C. melanophengos* to *C. rubrocostatum* on p. 373.

In K.B. no. 9, 1932, p. 453, line 8, *Campanulata spathulata* should read *Campanula spathulata*.

Mr. B. L. Burtt.—The Ministry of Agriculture and Fisheries has appointed Mr. B. L. Burtt as Assistant Botanist in the Director's Office.

---

* "Geographisch-Morphologische Studien über Aster alpinus L. und verwandte Arten," Max Onno in Bibliotheca Botanica, xxvi. Heft 106. Pp. 83, 6 plates, 6 maps and 6 text figs. Stuttgart, 1932.

†By Forrest Shreve, Desert Laboratory of the Carnegie Institution of Washington, Tucson, Arizona. Baltimore, The Williams & Wilkins Co., 1931, pp. ix+195, figs. 43. Price 16*s*.

Printed under the authority of His Majesty's Stationery Office,
By the South Essex Recorders, Ltd., High Road, Ilford.

(760) Wt. 71/28 925 2/33 S.E.R. Ltd. Gp. 9